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GOVERNMENT REPORTS

Announcements & Index

Volume 81, Number 11 May 22, 1981

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcateogry
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A093 458/8 MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Aerospace Engineering.
A Least Square Finite Element Technique for Transonic Flow with Shock,
Aspi Rustom Wadia. 22 Aug 77, 12p
Contract N00014-75-C-0375, Grant AFOSR-74-2559
Availability: Microfiche copies only.

The governing differential equation for the one-dimensional, transonic flow in a laval nozzle in the vicinity of the throat was obtained in the non-dimensional form. A least square finite element technique was used with a linearly interpolating polynomial to reduce the governing equation to a system of non-linear algebraic equations which were solved numerically by Newton's method. The system of partial differential equations for the two dimensional flow in a laval nozzle was also obtained in the non-dimensional form. The method of integral relations was used to replace the original system of partial differential equations by a system of ordinary differential equations. Using the least square finite element technique a computer program was developed for the construction and solution of the non-linear equations for the laval nozzle problem. The results including the location of the shock in the flow are presented. (Author)

AD-A093 459/6 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
The Reynolds Number for Transition on a Flat Plate in the RAE 4 ft x 3 ft Low Turbulence Wind Tunnel.
Technical memo.,
K. G. Winter, and E. C. Maskell. 30 May 80, 22p
RAE-TM-AERO-1854, DRIC-BR-75309

Reynolds numbers for transition on a flat plate measured in two brief series of tests in the RAE 4 ft x 3 ft tunnel with two different screen arrangements in the settling chamber are presented. In the two series the transition Reynolds number varies in magnitude in opposite senses with tunnel speed

but the same trend is indicated for the variation with turbulence level. At the lowest level of turbulence achieved, the transition Reynolds number approaches 6 million, and according to Mack's calculations, this would correspond to a value of n of 13 for the e to the n power method. (Author)

AD-A093 819/1 PC **A05**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Hypersonic Boundary Layer Transition Experiments.
Final rept. Sep 76-Sep 79,
Kenneth F. Stetson. Oct 80, 85p Rept no. AFWAL-TR-80-3062

New hypersonic wind tunnel data have been obtained to investigate boundary layer transition, with primary emphasis given to tip bluntness and angle of attack effects. The rearward displacement of transition on the cone frustum due to tip bluntness was found to be quite sensitive to free stream Mach number as well as the entropy layer swallowing by the boundary layer. At the highest Mach number obtained in these experiments (M = 9.3), the length of laminar flow could be extended to about nine times the length of laminar flow of a sharp cone at identical conditions. The sensitivity of the maximum rearward displacement of transition with free stream Mach number appeared to be primarily related to local Reynolds number reduction because of pressure losses across the bow shock. Low transition Reynolds numbers typically found on nosetips, extended onto the front portion of the cone frustum. It appears that the still unexplained low transition Reynolds numbers associated with blunt bodies in hypersonic flow includes not only the nosetip region, but the forward portion of the cone frustum. Transition location was found to be sensitive to small changes in angle of attack, and both the sharp and blunt tips produced a rearward movement of transition on the windward ray at small angles of attack. A low supersonic flared nozzle closely duplicated the hypersonic pressure and heat transfer distributions over the nose region of a blunt body.

AD-A093 982/7 PC **A06**/MF **A01**
Dynamics Technology, Inc., Torrance, CA.
Analysis for Obtaining High Lift Pressure Distributions for Transonic Airfoils.
Technical rept.,
E. James, and K. Kusunose. Jun 80, 110p Rept no. DT-7817-6
Contract N00014-79-C-0458

This report describes the development of a method for obtaining an optimum pressure distribution over the suction side of an airfoil operating in the transonic speed regime. The pressure distribution is optimum in the sense that maximum lift on the airfoil section is desired while the flow over the airfoil remains fully attached. The development allows for shocked and shock free flows over the airfoil with a compressible and mixed laminar-turbulent boundary layer. The boundary layer is typically maintained on the verge of incipient separation over the rearward stretch of the airfoil. The pressure recovery distribution is obtained from a compressible extension of Stratford's incompressible turbulent boundary layer separation criterion which is also given in the report. A variational problem for maximum lift is formulated and solved to yield the location of the onset of the pressure recovery and the pressure distribution forward of this point. (Author)

N81-14975/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Wind-Tunnel Measurements and Comparison with Flight of the Boundary Layer and Heat Transfer on a Hollow Cylinder at Mach 3.
R. L. Stallings, Jr., and M. Lamb. Dec 80, 48p
NASA-TP-1789, L-14044

The wind tunnel tests were conducted both with and without boundary layer trips at Mach 3 and nominal free stream Reynolds numbers per meter ranging from 3.3 x 10 the 6th power. Instrumentation consisted of pressure orifices, thermocouples, a boundary layer pitot pressure rake, and a floating element skin friction balance. Measurements from both wind tunnel and flight were compared with existing engineering prediction methods.

N81-14976/7 PC **A09**/MF **A01**
Detroit Diesel Allison, Indianapolis, IN.
Experimental Determination of Unsteady Blade Element Aerodynamics in Cascades. Volume 2: Translation Mode Cascade.
Final rept.,
R. E. Riffel, and M. D. Rothrock. Dec 80, 183p
NASA-CR-165166, EDR-10361-V-2
Contract NAS3-20055

A two dimensional cascade of harmonically oscillating airfoils was designed to model a near tip section from a rotor which was known to have experienced supersonic translational model flutter. This five bladed cascade had a solidity of 1.52 and a setting angle of 0.90 rad. Unique graphite epoxy airfoils were fabricated to achieve the realistic high reduced frequency level of 0.15. The cascade was tested over a range of static pressure ratios approximating the blade element operating conditions of the rotor along a constant speed line which penetrated the flutter boundary. The time steady and time unsteady flow field surrounding the center cascade airfoil were investigated.

N81-14977/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Finite Element Analysis of Inviscid Subsonic Boattail Flow.
R. V. Chima, and P. M. Gerhart. 1981, 16p
NASA-TM-81650, E-651
Presented at the Nineteenth Aerospace Sci. Meeting, St. Louis, 12-15 Jan. 1981; Sponsored by AM. Inst. Of Aeronautics and Astronautics.

A finite element code for analysis of inviscid subsonic flows over arbitrary nonlifting planar or axisymmetric bodies is described. The code solves a novel primitive variable formulation of the coupled irrotationality and compressible continuity equations. Results for flow over a cylinder, a sphere, and a NACA 0012 airfoil verify the code. Computed subcritical flows over an axisymmetric boattailed afterbody compare well with finite difference results and experimental data. Interative coupling with an integral turbulent boundary layer code shows strong viscous effects on the inviscid flow. Improvements in code efficiency and extensions to transonic flows are discussed.

N81-14983/3 PC **A02**/MF **A01**
National Aerospace Lab., Tokyo (Japan).
A Method for Obtaining Shockless Transonic Flows past Airfoils, Partially Modified from a Given Arbitrary Airfoil.
M. Nakamura. Aug 80, 25p NAL-TR-602T

A method for obtaining shockless transonic flows past two dimensional airfoils is described. The methods of calculations of transonic flows are roughly classified into two groups: the direct method, which yields the transonic flows past given arbitrary airfoils; and the inverse method, which determines shapes of airfoils. In the former method, the shock waves normally exist in the region of transonic flows, and some numerical methods are already known. In the latter, transonic flows with given pressure distribution are calculated, and several analytical methods also exist. The method described is a combination of the direct method yield, the shockless transonic flows past airfoils which are partially modified from a given arbitrary airfoil. If one puts an arbitrary airfoil into a region of free stream flows with a comparatively large free stream Mach number, the shock waves generally exist.

N81-14984/1 PC **A03**/MF **A01**
National Aerospace Lab., Tokyo (Japan).
An Investigation of Support-Interference Effects.
N. Hashimoto, K. Hozumi, T. Koyama, A. Yoshizawa, and T. Matsuzaki. Aug 80, 28p NAL-TR-622
In English and Japanese.

Base pressure and pressure distribution on the sting surface in the flow having a free stream Mach number of 7.1 and a free stream Reynolds number based on the unit length from 0.2 x 10 to the 5th power to 2.0 to x 10 to the 5th power/cm were measured. The oil flow observation on the sting surface was made at the same time. Avoiding the strong base pressure rise caused by the effect of strut, the sting flare corner effect was investigated. The experimental results showed that the base pressure depends upon the Reynolds number and is affected by the interaction of the base recirculating flow and the separated flow around the sting flare corner. This effect of the sting flare corner becomes smaller as the length of the sting increases and the standard length of a sting which has a sufficiently minimal effect on the base pressure was obtained. In order to predict the base pressure of the sting mounted models, the correlation of the base pressure with local flow properties, immediately preceding the base, is discussed for those cases where there is little effect from the sting flare and strut.

N81-15156/5 PC **A07**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Heave Instabilities of Amphibious Air Cushion Suspension Systems.
M. J. Hinchey. Nov 80, 135p UTIAS-246, ISSN-0082-5255
Sponsored by Transport Canada Research and Development Centre and National Research Council of Canada.

Attempts to ascertain the accuracy with which analytical models can be used to predict the onset of heave instabilities are described with emphasis on relatively simple configurations in which important effects are uncoupled. For the basic element of multicell systems, even relatively short supply ducting can have a very large effect, especially at low flows or hover-gaps where the duct-cushion system tends to behave as a Helmholtz resonator. For loop and segment systems, it is concluded that duct effects would be small. Internal flow effects associated with jets and vortices within the basic cushion volume are shown to be relatively unimportant at practical flow rates, although they are important at very high flow rates. Nonlinear phenomena, and procedures for controlling or quenching limit cycle amplitudes are explored. Suggestions for future work are included.

N81-15237/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Aerothermal Environment in Chordwise Gaps Between Split Elevons at Mach 6.8.
L. R. Hunt. Dec 80, 45p NASA-TP-1783, L-14076

A large scale model representing a wing elevon junction on a shuttle-type entry vehicle was aerothermally tested in the Langley 8 foot high temperature structures tunnel with a turbulent boundary layer on the wing and elevon. The flow pattern between elevons was studied, and the pressure and heat load were determined within the chordwise gaps formed by adjacent elevons and by the stub fairing which separates the elevons. Model angle, elevon deflection angle, and gap widths were varied. Heating in the gaps was generally proportional to windward surface heating and inversely proportional to gap width. Maximum heating between the elevon and stub was 36 percent of the windward wing surface for a 0.18 cm wide elevon stub gas, and maximum heating between elevons was 30 percent of the heating on the windward elevon surfaces for a 7.7 cm wide elevon gap.

N81-15239/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Numerical Simulation of Flows in Curved Diffusers with Cross-Sectional Transitioning Using a Three-Dimensional Viscous Analysis.
C. E. Towne, and B. H. Anderson. 1981, 19p
NASA-TM-81672, E-696
Presented at 19TH Aerospace Sci. Meeting, St. Louis, 12-15 Jan. 1981; Sponsored by Aiaa.

A three dimensional analysis for fully viscous, subsonic, compressible flow is evaluated. An approximate form of the Navier Stokes equations is solved by an implicit spatial marching technique. Calculations were made for flow in a circular S duct and in the F 16 inlet duct. The computed total pressure contours and secondary flow velocity vectors are presented. Qualitative comparisons with experiment are shown for both ducts. The analysis is used to show how the cross section transitioning in the F 16 inlet suppresses the development of a secondary flow vortex.

N81-15263/9 PC **A15**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Measurements and Predictions of Complex Turbulent Flows, Volume 1.
1980, 335p VKI-LS-1980-3-V-1
Lecture Held at Rhode-Saint-Genese, Belgium, 11-15 Feb. 1980.

No abstract available.

N81-15397/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Effects of Angle of Attack and Ventral Fin on Transonic Flutter Characteristics of an Arrow-Wing Configuration.
R. V. Doggett, and R. A. Ricketts. Dec 80, 29p NASA-TM-81914, L-14114

Experimental transonic flutter results are presented for a simplified 1/50 size, aspect ratio 1.77, wind tunnel model of an arrow wing design. Flutter results are presented for two configurations; namely, one with and one without a ventral fin mounted at the 0.694 semispan station. Results are presented for both configurations trimmed to zero lift and in a lifting condition at angles of attack up to 4 deg. The results show that the flutter characteristics of both configurations are similar to those usually observed. Increasing angle of attack reduces the flutter dynamic pressure by a small amount (about 13 percent maximum) for both configurations. The addition of the fin to the basic wing increases the flutter dynamic pressure. Calculated results for both configurations in the nonlifting condition obtained by using subsonic doublet lattice unsteady aerodynamic theory correlate reasonably well with the experimental results. Calculated results for the basic wing obtained by using subsonic kernal function unsteady aerodynamic theory did not agree as well with the experimental data.

PB81-803181 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Boundary Layer Transition. November, 1977-December, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 77-Dec 80.
Feb 81, 339p
Supersedes PB80-803265, and NTIS/PS-78/1344. See also 1964-1968, NTIS/PS-75/816, 1969-1971, NTIS/PS-75/817, and 1972-1976, NTIS/PS-77/1115.

The bibliography presents the most recent coverage on boundary layer transition. Included are laminar to turbulent flow in gases at subsonic, transonic, supersonic, and hypersonic velocities, with a few cases of relaminarization; transition in the boundary layer flow of various liquids; flow transition involving structural and configurational forms; experimental equipment, facilities, tests, and methods; theoretica, mathematical, and computer aided analyses; methods of inducing of inhibiting transition; flow fields, and interactions of other fields such as acoustic or electrical. The research is often applied to aerospace vehicles, wings, airfoils, geometric forms, and models. Also discussed are eddy viscosity, magnus effects, turbulence bursts, and stability. Data are included on angle of attack, disturbances, sensors, heat transfer, and allied subjects. Meteorological boundary layers are excluded. (This updated bibliography contains 334 citations, 75 of which are new entries to the previous edition.)

1B. Aeronautics

AD-A093 654/2 PC **A17**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
A Piloted Simulator Investigation of Static Stability and Stability Control Augmentation Effects on Helicopter Handling Qualities for Instrument Approach.
Technical memo.,
J. V. Lebacqz, R. D. Forrest, and R. M. Gerdes. Sep 80, 393p NASA-A-8125, NASA-TM-81188, FAA-RD-8064

A motion-base simulator was used to compare the flying qualities of three generic single-rotor helicopters during a full-attention-to-flight control task. Terminal-area VOR instrument approaches were flown with and without turbulence. The objective of this NASA/FAA study was to investigate the influence of helicopter static stability in terms of the values of cockpit control gradients as specified in the existing airworthiness criteria, and to examine the effectiveness of several types of stability control augmentation systems in improving the instrument-flight-rules capability of helicopters with reduced static stability. Two levels of static stability in the pitch, roll, and yaw axes were examined for a hingeless-rotor configuration; the variations were stable and neutral static stability in pitch and roll, and two levels of stability in yaw. For the lower level of static stability, four types of stability and control augmentation were also examined for helicopters with three rotor types: hingeless, articulated, and teetering. Pilot rating results indicate the acceptability of neutral static stability longitudinally and laterally and the need for pitch-roll attitude augmentation to achieve a satisfactory system. (Author)

AD-A093 784/7 PC **A12**/MF **A01**
Simula, Inc., Tempe, AZ.
Aircraft Crash Survival Design Guide. Volume I. Design Criteria and Checklists. Revision.
Final rept. Sep 77-Aug 80,
S. P. Desjardins, D. H. Laananen, and G. T. Singley, III. Dec 80, 272p TR-7927, USARTL-TR-79-22A
Contract DAAJ02-77-C-0021
Revision of report dated Oct 71, AD-733 358. See also Volume 2, AD-A082 512.

This five-volume document has been assembled to assist design engineers in understanding the problems associated with the development of crashworthy U. S. Army aircraft. Contained herein are not only a collection of available information and data pertinent to aircraft crashworthiness but suggested design conditions and criteria as well. The five volumes of the Aircraft Crash Survival Design Guide cover the following topics: Volume I - Design Criteria and Checklists; Volume II - Aircraft Crash Environment and Human Tolerance; Volume III - Aircraft Structural Crashworthiness; Volume IV - Aircraft Seats, Restraints, Litters, and Padding; and Volume V - Aircraft Postcrash Survival. This volume contains concise criteria drawn from Volume II - V, supplement by checklists intended to assist designers in implementation of the criteria. (Author)

1C. Aircraft

AD-A093 552/8 PC **A03**/MF **A01**
Southampton Univ. (England). Dept. of Electrical Engineering.
Static Charge in Aircraft Fuel Tanks.
Final technical rept. 1 Jul 77-30 Sep 79,
Charles R. Martel. Sep 80, 38p AFWAL-TR-80-2049
Grant AFOSR-77-3373

This program investigates electrostatic hazards associated with aircraft fueling. The tribo electric phenomena of reticulated polyurethane foam charging was examined using JP-4. An attempt was made to understand the basic electrostatic phenomena involved when fuel is pumped into aircraft fuel tanks containing reticulated, polyurethane foam. The investigation also involved the development and study of alternative foam materials having enhanced electrical and charge dissipation characteristics as a means of eliminating the electrostatic hazards during refueling. (Author)

AD-A093 711/0 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Wind-Tunnel Test of an Articulated Helicopter Rotor Model with Several Tip Shapes.
Technical memo.,
John D. Berry, and Raymond E. Mineck. Dec 80, 95p NASA-L-12774, NASA-TM-80080, USAAVRADCOM-TR-79-49

A wind-tunnel investigation has been conducted using an articulated helicopter model rotor system to determine the effects of several blade tip designs on both the performance and acoustic characteristics of the rotor. Only the performance characteristics are presented in this paper. Six tip shapes were tested: a square (baseline) tip, an ogee tip, a subwing tip, a swept tip, a winglet tip, and a short ogee tip. Tests were conducted at two rotor rotational speeds and five advance ratios including hover. In hover at the lower rotational speed and a given lift coefficient, the swept, ogee, and short ogee tips had about the same torque coefficient, and the subwing and winglet tips had a larger torque coefficient than the baseline square tip blades. In simulated forward flight, the ogee tip had values of torque coefficient very close to or less than the baseline square tip blades. In simulated forward flight at 1200 rpm, the ogee tips showed a decrease in torque coefficient relative to the baseline blades as drag coefficient decreased. The swept tip blades required less torque coefficient at lower rotational speeds than the baseline square tip blades and roughly equivalent torque coefficient at higher rotational speeds in forward flight. The short ogee tip was tested in limited forward flight conditions and it required higher torque coefficient at higher lift coefficient than the baseline square tip blade. (Author)

AD-A093 729/2 PC **A19**/MF **A01**
Kaman AviDyne, Burlington, MA.
Measurements of Blast Pressures on a Rigid 35 deg Sweptback Wing at Mach 0.76 from Rocket Propelled Sled Tests.
Final rept. 1 Feb 79-1 Jan 80,
Dale A. Kleppin, J. Ray Ruetenik, and Robert F. Smiley. 31 Jan 80, 434p KA-TR-175, DNA-5211F
Contract DNA001-79-C-0157

Interaction of a blast wave with a 35 deg-sweepback wing model was measured in a series of two sled tests performed on the 50,788-ft sled tract at Holloman AFB in September 1979. The model was rigid and had a 5.6 aspect ratio and 0.42 taper ratio. The sled, travelling at Mach 0.76, was intercepted successively by blast waves produced from TNT charges. Blast-induced pressure differentials were measured at 20 locations on the wing. Shock overpressures ranged from 1.3 to 4.1 psi and intercept angles were 45, 90 and 135 degrees from head-on. This report describes the tests and presents the test results. Preliminary analysis of the test results indicates the existence of non-linear blast-induced airloads on the model at the lowest shock overpressure. (Author)

AD-A093 739/1 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Interference on a Model Afterbody from Downstream Support Hardware at Transonic Mach Numbers.
Final rept. 27 Jun-2 Jul 79,
Earl A. Price, Jr. Jan 81, 51p Rept no. AEDC-TR-80-27
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

An experimental program was conducted to parametrically study the interference on an afterbody model that would be produced by the aft-support blade used with a wingtip support system. Geometric variables included the blade axial location, thickness, span, chord, and leading- and trailing-edge contours. Data were obtained over the Mach number range from 0.6 to 1.2 with the model at zero angle of attack. Interference was evaluated by comparing afterbody drag from a reference configuration, which had the aft-support blade removed, to the various configurations with a blade installed. A reasonable correlation of the blade interference effects on the afterbody drag coefficient was obtained, which included the influence of support blade axial position and blockage. Decreasing blade leading-edge bluntness by a factor of two resulted in a significant reduction of interference in the Mach number range from 0.9 to 1.1. Significantly greater interference was measured without jet flow than with jet flow. It is shown that a Euler equation computer code is a useful tool for the design of minimum interference support systems. (Author)

AD-A093 758/1 PC **A04**/MF **A01**
Aeronautical Systems Div., Wright-Patterson AFB, OH.
Comparison of Flight Load Measurements Obtained from Calibrated Strain Gages and Pressure Transducers.
Final Rept. Nov 76-Feb 79,
John W. Rustenburg. Oct 80, 52p Rept no. ASD-TR-80-5038

Net shear, bending moment, and torsion at one wing station derived from concurrent strain gage and pressure transducer measurements are compared. Comparisons are made for results from normal and abrupt symmetrical pullup/pushdown, and rolling pullout maneuvers at subsonic and supersonic speeds and four wing sweeps. With few exceptions good to very good correlation is shown. (Author)

AD-A093 772/2 PC **A05**/MF **A01**
Mission Research Corp., Albuquerque, NM.
Aircraft EMP Isolation Study.
Final rept.,
A. Finci, H. Price, P. Chao, S. Mercer, and T. Naff. Jul 80, 97p AFWL-TR-79-156, AD-E200 630
Contract F29601-78-C-0082

This report presents the results of a preliminary study into methods for electrically isolating the E-4B, the EC-135, and the EC-130 aircraft during EMP tests where the aircraft under test is directly driven by a high-voltage pulser.

AD-A093 888/6 PC **A07**/MF **A01**
Honeywell Systems and Research Center, Minneapolis, MN.
Two-Axis, Fluidically Controlled Thrust Vector Control System for an Ejection Seat.
Robert B. Beale, Robert V. Burton, and Norman E. Miller. Jul 80, 150p 80SRC22, AFWAL-TR-80-3080
Contract F33615-76-C-3070

A two-axis, hydrofluidic, thrust vector control (TVC) system was designed to stabilize an ejection seat during the critical rocket burn portion of the trajectory which should reduce the g loads on the crewmember and result in higher trajectories. The dynamic performance of a seat with a fluidic TVC system was analytically evaluated against established ejection seat requirements and physiological limits. This analysis showed that pitch rates were reduced by 60 percent and yaw rates by 90 percent when compared with a seat with no stabilizing system. Breadboard hardware was fabricated and tested with the components meeting requirements. A prototype integrated fluidic circuit and a moveable nozzle was then designed, fabricated and tested. The prototype system did not meet all the requirements due to a null bias instability in the fluidic amplifier which was caused by a nozzle asymmetry in the fluidic amplifier mold. The FTVC System included a vortex rate sensor, fluidic lag-lead compensator, and a four-stage fluidic servovalve. These components will use hot gas pressurized oil to drive a hydrostatically supported, piston actuated ball and socket nozzle with 20 deg of deflection of a 3500 lb thrust rocket. Initial nozzle breakaway friction was 170 in-lb. Operating stiction was 135 in-lb and running friction was 80 in-lb.

AD-A093 970/2 PC **A02**/MF **A01**
Army Research and Technology Labs., Moffett Field, CA. Aeromechanics Lab.
Viscous-Inviscid Interaction on Oscillating Airfoils in Subsonic Flow.
W. J. McCroskey, and S. L. Pucci. 15 Jan 81, 17p
Paper presented at AIAA Aerospace Sciences Meeting (19th) Held 12-15 Jan 81, St. Louis, MO, Paper Number AIAA-81-0051.

Selected results from an extensive oscillating-airfoil experiment are analyzed and reviewed. Four distinct regimes of viscous-inviscid interaction are identified, corresponding to varying degrees of unsteady flow separation. The dominant fluid dynamic phenomena are described for each regime. Ten specific test cases, including the appropriate flow conditions and experimental results, are proposed for evaluating unsteady viscous theories and computational methods. (Author)

AD-A093 971/0 PC **A04**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Leading-Edge Separation from a Slender Rolling Wing-Body Combination.
Technical rept.,
I. P. Jones. Mar 80, 73p RAE-TR-80039, DRIC-BR-74711

A vortex-sheet model of the leading-edge separation is used to study the flow about a slender wing-body combination in steady rolling motion at zero incidence. The equations which model the flow are derived and the numerical method to solve these equations is described. The results presented concentrate on those values of the parameters for which comparison may be made with the experimental results of Harvey for a rolling delta wing. Results obtained using simplified flow models are also described. (Author)

AD-B009 356/7 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Comparison of Parachute Performance at Transonic Mach Numbers for Conical Ribbon Parachutes Constructed of Nylon and Kevlar-29 Materials.
Final rept.,
W. L. Peters. Feb 76, 46p Rept no. AEDC-TR-76-21
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn., Rept. no. ARO-PWT-TR-75-160.
Distribution limitation now removed.

Tests were conducted in the Propulsion Wind Tunnel to determine deployment and inflation characteristics which would allow comparative performance evaluations to be made of four conical ribbon parachute versions constructed of either nylon and/or Kevlar-29 materials. In general, parachutes constructed of Kevlar-29 material withstood the same opening shock loads while exhibiting a shorter damping time for inflation drag loads compared with nylon-constructed chutes. The least postinflation drag dynamics were exhibited by those parachutes which contained Kevlar-29 materials. A significant savings in weight and volume was realized by using Kevlar-29 as a substitute for nylon in parachute construction.

AD-368 425/5 PC **A02**/MF **A01**
David Taylor Model Basin, Washington, DC. Aerodynamics Lab.
An Open-Ocean V/STOL Seaplane for the ASW Mission with Emphasis on Tracking and Surveillance.
Research and development rept.,
Robert M. Williams. Nov 65, 22p Rept nos. DTMB-C-2107, DTMB-Aero-1097
Distribution limitation now removed.

Results are presented of a computerized simulation of an ASW-V/STOL seaplane design capable of operation in high sea states. This study was made to evaluate the effectiveness of a technique utilizing a passive Air Transportable Sonar Surveillance System (ATSSS) with various bearing erorrs (accuracies) in the performance of the contact maintenance (tracking) mission. The results indicate the tradeoff permitted in bearing error versus fuel consumption and tracking performance using the ATSSS, and also demonstrate the advantages of an integrated ATSSS-disposable sonobuoy technique. The incorporation of a variable-length mission which is a function of submarine tactic and sea state is also considered. (Author)

AD-368 426/3 PC **A04**/MF **A01**
David Taylor Model Basin, Washington, DC. Aerodynamics Lab.
An Open-Ocean V/STOL Seaplane for the ASW Mission.
Research and development rept.,
Richard D. Murphy , Gary W. Brasseur , Robert Bart , and Robert M. Williams. Nov 65, 51p Rept nos. DTMB-C-2106, DTMB-Aero-1096
Presented at the AIAA/USN Marine Systems and ASW Conference, 10 Mar 65, San Diego, Calif.
Distribution limitation now removed.

The results of preliminary vehicle design and mission-oriented operations analysis for predicted ASW systems are incorporated to form an index of tactical capability of an open-ocean seaplane. The vehicle is a canard configuration with free-propeller propulsion on tilting lifting surfaces. Regenerative cycle turboprop engines power six 20-foot-diameter propellers to achieve VTOL capability and efficient cruise at 275 knots for the 93,000-pound VTOL or 115,000-pound STOL aircraft. Computer simulation of mission performance covering several thousand hours indicates favorable utilization of manpower and equipment. (Author)

AD-379 260/3 PC **A03**/MF **A01**
David Taylor Model Basin, Washington, DC. Aerodynamics Lab.
An Evaluation of the Wing-in-Ground Effect (Wig) Transport Aircraft Concept.
Research and development rept.,
Paul Comisarow, and Gary W. Brasseur. Nov 66, 27p Rept nos. DTMB-C-2318, DTMB-Aero-1121
Distribution limitation now removed.

An evaluation was made of the 'wing in ground effect' (WIG) interface vehicle as a cargo transport. The WIG aircraft designs, with high lift/drag ratios, showed significant increases in payload-range over current and proposed cargo aircraft (specifically, the c-141 and the C-5A). However,results indicate that the C-5A cargo aircraft would have a somewhat higher productivity than the WIG cargo transport. The large differences in cruise speed between these aircraft negated the excellent payload-range capabilities of the WIG aircraft concept. The unique qualities of the WIG may be more effectively utilized in other specialized military aircraft applications.

AD-861 437/2 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Aerodynamic Characteristics of Ballutes and Disk-Gap-Band Parachutes at Mach Numbers from 1.8 to 3.7.
Final rept. 30 Jul-13 Sep 69,
Lawrence L. Galigher. Nov 69, 46p Rept no. AEDC-TR-69-245
Contract F40600-69-C-0001
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.
Distribution limitation now removed.

A test was conducted in a supersonic wind tunnel, to determine deployment characteristics and aerodynamic performance of disk-gap-band parachutes of various geometric porosities and ballutes with various ram-air inlet configurations. Deployments were made from a reentry-type model at nominal free-stream Mach numbers from 2.0 to 3.7 at a nominal free-stream dynamic pressure of 70 psf. (Author)

N81-14962/7 PC **A18**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Bird Flight and Airplane Flight.
A. Magnan. Dec 80, 424p NASA-TM-75777
Contract NASW-3199
Transl. Into English from Serv. Tech. De l'Aeron. (Paris), Bull. 74, Jun. 1931 p 5-307. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Research was based on a series of mechanical, electrical, and cinematographic instruments developed to measure various features of air current behavior as well as bird and airplane flight. Investigation of rising obstruction and thermal currents led to a theory of bird flight, especially of the gliding and soaring types. It was shown how a knowledge of bird flight can be applied to glider and ultimately motorized aircraft construction. The instruments and methods used in studying stress in airplanes and in comparing the lift to drag ratios of airplanes and birds are described.

N81-14970/0 PC **A06**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
A System for Aerodynamic Design and Analysis of Supersonic Aircraft. Part 1: General Description and Theoretical Development.
Final rept., Sep. 1978 - Aug. 1980.
W. D. Middleton, and J. L. Lundry. Dec 80, 101p NASA-CR-3351, D6-41840-1
Contract NAS1-15534

An integrated system of computer programs was developed for the design and analysis of super-

sonic configurations. The system uses linearized theory methods for the calculation of surface pressures and supersonic area rule concepts in combination with linearized theory for calculation of aerodynamic force coefficients.

N81-14971/8 PC **A06**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
A System for Aerodynamic Design and Analysis of Supersonic Aircraft. Part 3: Computer Program Description.
Final rept., Sep. 1978 - Aug. 1980.
W. D. Middleton, J. L. Lundry, and R. G. Coleman. Dec 80, 122p NASA-CR-3353, D6-41840-3
Contract NAS1-15534

The computer program documentation for the design and analysis of supersonic configurations is presented. Schematics and block diagrams of the major program structure, together with subroutine descriptions for each module are included.

N81-14973/4 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Bibliography of Supersonic Cruise Research (Scr) Program from 1977 to Mid-1980.
S. Hoffman. Dec 80, 106p NASA-RP-1063, L-13764

The supersonic cruise research (SCR) program, initiated in July 1972, includes system studies and the following disciplines: propulsion, stratospheric emission impact, structures and materials, aerodynamic performance, and stability and control. In a coordinated effort to provide a sound basis for any future consideration that may be given by the United States to the development of an acceptable commercial supersonic transport, integration of the technical disciplines was undertaken, analytical tools were developed, and wind tunnel, flight, and laboratory investigations were conducted. The present bibliography covers the time period from 1977 to mid-1980. It is arranged according to system studies and the above five SCR disciplines. There are 306 NASA reports and 135 articles, meeting papers, and company reports cited.

N81-14974/2 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Leading-Edge Deflection Optimization for a Highly Swept Arrow Wing Configuration.
P. L. Coe, Jr., J. K. Huffman, and J. W. Fenbert. Dec 80, 59p NASA-TP-1777, L-13820

Tests were also conducted to determine the sensitivity of the lateral stability derivative C sub l sub beta to geometric anhedral. The optimized leading edge deflection was developed by aligning the leading edge with the incoming flow along the entire span. Owing to the spanwise variation of upwash, the resulting optimized leading edge was a smooth, continuously warped surface. For the particular configuration studied, levels of leading edge suction on the order of 90 percent were achieved with the smooth, continuously warped leading edge contour. The results of tests conducted to determine the sensitivity of C sub l sub beta to geometric anhedral indicate values of delta C sub l sub beta/delta T which are in reasonable agreement with estimates provided by simple vortex lattice theories.

N81-14981/7 PC **A23**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Experimental Aerodynamic Characteristics of Two V/STOL Fighter/Attack Aircraft Configurations at Mach Numbers from 0.4 to 1.4.
W. P. Nelms, D. A. Durston, and J. R. Lummus. Dec 80, 529p NASA-TM-81234, A-8338

A wind tunnel test was conducted to measure the aerodynamic characteristics of two horizontal attitude takeoff and landing V/STOL fighter/attack aircraft concepts. In one concept, a jet diffuser ejector was used for the vertical lift system; the other used a remote augmentation lift system (RALS). Wind tunnel tests to investigate the aerodynamic uncertainties and to establish a data base for these types of concepts were conducted over a Mach number range from 0.2 to 2.0. The present report covers tests, conducted in the 11 foot transonic wind tunnel, for Mach numbers from 0.4 to 1.4. Detailed effects of varying the angle of attack (up to 27 deg), angle of sideslip (-4 deg to +8 deg), Mach number, Reynolds number, and configuration buildup were investigated. In addition, the effects of wing trailing edge flap deflections, canard incidence, and vertical tail deflections were explored. Variable canard longitudinal location and different shapes of the inboard nacelle body strakes were also investigated.

1D. Aircraft Flight Control and Instrumentation

AD-A093 989/2 MF **A01**
Dayton Univ., OH. Research Inst.
Designer's Guide for the Panel Program.
Technical interim rept.,
Medhat Korna, and Nilss Aume. Oct 80, 67p
UDR-TR-80-64, AFAMRL-TR-80-124
Contract F33615-78-C-0507
Availability: Microfiche copies only.

This Designer's Guide describes an interactive computer graphics program intended for the computer aided design of avionics control and display panels. Using this program, a designer can specify the basic panel on which all other components will be mounted as well as the components themselves. Also, he can locate and relocate the components, add graphic elements (text, lines, circles), and call for printed, punched, or hard copy (plot) output. The requirements and considerations of several applicable MIL-STANDARDS have been incorporated into the program to facilitate the design process. The Guide to the operation of the PANEL program includes descriptions of the processing available for each of the program functions and subfunctions. A listing of the program is also included along with a brief description of most of the subroutines. (Author)

N81-14993/2 PC **A06**/MF **A01**
Lockheed-Georgia Co., Marietta.
A Survey of New Technology for Cockpit Application to 1990's Transport Aircraft Simulators.
Final rept., Jul. 1979 - Jan. 1980.
A. P. Holt, Jr., D. O. Noneaker, and L. Walthour. Dec 80, 118p NASA-CR-159330, LG81ER0074
Contract NAS1-15546

Two problems were investigated: inter-equipment data transfer, both on board the aircraft and between air and ground; and crew equipment communication via the cockpit displays and controls. Inter-equipment data transfer is discussed in terms of data bus and data link requirements. Crew equipment communication is discussed regarding the availability of CRT display systems for use in research simulators to represent flat panel displays of the future, and of software controllable touch panels.

N81-14997/3 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Simulator Study of Conventional General Aviation Instrument Displays in Path-Following Tasks with Emphasis on Pilot-Induced Oscillations.
J. J. Adams. Dec 80, 55p NASA-TP-1776, L-13785

A study of the use of conventional general aviation instruments by general aviation pilots in a six degree of freedom, fixed base simulator was conducted. The tasks performed were tracking a VOR radial and making an ILS approach to landing. A special feature of the tests was that the sensitivity of the displacement indicating instruments (the RMI, CDI, and HSI) was kept constant at values corresponding to 5 n. mi. and 1.25 n. mi. from the station. Both statistical and pilot model analyses of the data were made. The results show that performance in path following improved with increases in display sensitivity up to the highest sensitivity tested. At this maximum test sensitivity, which corresponds to the sensitivity existing at 1.25 n. mi. for the ILS glide slope transmitter, tracking accuracy was no better than it was at 5 n. mi. from the station and the pilot aircraft system exhibited a marked reduction in damping. In some cases, a pilot induced, long period unstable oscillation occurred.

N81-15702/6 PC **A03**/MF **A01**
Duke Univ., Durham, NC. Dept. of Computer Sciences.
Validation Methods Research for Fault-Tolerant Avionics and Control Systems sub-Working Group Meeting. Care 3 Peer Review.
K. S. Trivedi, and J. B. Clary. Dec 80, 30p NASA-CP-2167, L-14215
Contract NAG1-70
Meeting Held at Research Triangle Park, N.C., 15-16 Sep. 1980.

A computer aided reliability estimation procedure (CARE 3), developed to model the behavior of ultrareliable systems required by flight-critical avionics and control systems, is evaluated. The mathematical models, numerical method, and fault-tolerant architecture modeling requirements are examined, and the testing and characterization procedures are discussed. Recommendations aimed at enhancing CARE 3 are presented; in particular, the need for a better exposition of the method and the user interface is emphasized.

1E. Air Facilities

AD-A093 761/5 PC **A04**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Pavement Evaluation and Repair Recommendation Sierra Army Depot, Amedee Air Strip.
Final rept.,
Mohamed Y. Shahin. Nov 80, 66p Rept no. CERL-TR-M-283
Contract IAO-PR-9-80

The Pavement Condition Index (PCI) procedure was used to evaluate five alternatives for repairing the runway of the Amedee Air Strip, Sierra Army Depot, California. Based on the PCI analysis, it was recommended that the old surface be recycled and used as a base, with a new asphalt concrete surface added to a depth of 3 inches at the central 75 feet and tapered to 1 inch at the edges. This recommendation was based on the assumption that the engineer has flexibility in specifying the type and grade of asphalt needed. If not, reconstruction with concrete may be economically justified based on life cycle costs. (Author)

2.

AGRICULTURE

2B. Agricultural Economics

PB81-146870 PC **A02**/MF **A01**
Washington Univ., St. Louis, MO. Center for the Biology of Natural Systems.
Livestock Production on Beef and Hog Producing Organic Farms in the Midwest,
Georgia Shearer, Diane Wanner, George Kuepper, Susan Sweeney, and William Lockeretz. Sep 80, 17p NSF/RA-800345
Grant NSF-AER77-17031

Results are reported of a two-year comparative study of crop production as an index to total farm productivity on midwestern organic farms vs. conventional mixed grain-livestock farms. Such information is helpful in assessing the effect of reducing the use of farm chemicals on productivity and economic performance. The organic sample for

this study comprised 250 commercial scale beef and hog producing farms in the Western Corn Belt. The methodology of deriving production data and expenses is described.

PB81-152431 PC **A02**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
The Cattle Cycle--Looking to the '80's.
Staff rept.,
Richard J. Crom. Jan 81, 21p AGESS-810105

Price-production cycles in the cattle industry could be reduced substantially by gearing production levels to consumer demand. Economic benefits would accrue to both producers and society. This may be a possibility, since production units are larger and producers more management-oriented. Less heifer replacement and increased cow cull would be necessary, probably in 1982. Better information for producer decisionmaking, sponsored jointly by industry and Government, should be of value.

PB81-152449 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
The Current Dairy Industry Setting--Evolving Problems and Issues.
Staff rept.,
Richard F. Fallert, and Boyd M. Buxton. Jan 81, 44p AGESS-810121

The dairy industry has become concentrated in fewer and larger firms at the farm, processing, and distribution levels. Prices and terms of trade in the industry are undergirded by government milk pricing programs--primarily the price support program and the federal milk marketing order program. The goals and objectives of these programs are outlined and an evaluation is made of their performance. Emerging problems and issues resulting from price support levels, rapidly increasing energy costs, changing farm and market structure, improvements in transportation, and growth in cooperatives are enumerated.

PB81-154916 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Analysis of a Steady State Meat Sector for the 1980's.
Staff rept.,
Richard P. Stillman. Dec 80, 37p AGESS-801222.2
Portions of this document are not fully legible.

Levels of livestock and poultry production consistent with expected trends in consumer demand for beef (fed and nonfed), pork, and poultry are specified for the 1980's. Consumer demand for red meat and poultry is estimated as a function of income; the demand for individual meats is constrained by overall demand but allocated on the basis of historical trends and judgement. The composition of the livestock and poultry population necessary to support this level of consumption is based on a specific set of assumptions and is maintained at a level to avoid production patterns.

PB81-154924 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. International Economics Div.
PRC Provincial Total Grain Production 1969-79. Research Notes on Chinese Agriculture: Number 2.
Staff rept.,
Francis C. Tuan. Jan 81, 44p AGESS-801223

A variety of Chinese sources were used to reconstruct and compile China's provincial total grain production figures for 1969 to 1979. Compiling procedures and implications of the estimated results are briefly stated. Sources for all estimates are presented.

PB81-156531 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
An Evaluation of Price Spread and Cost Component Estimates for Choice Beef and Pork.
Staff rept.,
Karen D. Parham, and Lawrence A. Duewer. Dec 80, 33p AGESS-801215

Price spreads for beef and pork are a measure of the gross returns to the marketing firms involved. Comparison with costs estimates for marketing indicates the general level of the profits realized. Evaluation of cost and returns data provide public information on the efficiency and equity of the meat marketing sector. This report examines the history of price spread and cost component estimates, evaluates the accuracy and adequacy of the data, and suggests some alternative procedures. Available data allow some further improvement in estimating price spreads; but, more data are needed from marketing firms before cost components can be improved.

PB81-156549 PC **A04**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Energy Crisis Preparation: Policies and Practice for the Livestock, Dairy, and Poultry Industries.
Staff rept.,
Lawrence A. Duewer, and Harold B. Jones, Jr. Dec 80, 52p AGESS-801211

Availability of energy, particularly petroleum-based fuels, is a serious national concern. A long run problem exists, and a more serious short run supply shortage is possible. Energy is an essential part of producing, processing, marketing, and distributing animal products. Specific policies and practices affecting energy usage in the animal products industry are examined. Short, intermediate, and long run conservation measures are identified. Planning for and meeting an energy crisis is discussed, along with three sets of guides or suggested policies relevant to the animal products industry.

PB81-156580 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Cheese Pricing.
Agricultural economic rept.,
Harold W. Lough. Dec 80, 47p AER-462

Cheese prices, key market indicators for the entire dairy industry, rose rapidly in the seventies because of rising demand for cheese. Cheese prices nationwide follow those on the National Cheese Exchange, which itself handles less than 1 percent of total U.S. cheese production. Retailers usually give cheese the highest profit margin of all dairy products; since 1973, retail cheese prices have risen more rapidly than wholesale prices. Dairy farmers receive about 48 cents for the milk used in $1 worth of cheese at the retail level; processing, packaging, and marketing take the other 52 cents.

2C. Agricultural Engineering

PB81-148058 PC **A03**/MF **A01**
New Mexico Water Resources Research Inst., Las Cruces.
Using Saline Water for Crop Production in New Mexico.
Technical completion rept.,
George A. O'Connor. Dec 80, 36p WRRI-127, W81-01156, OWRT-A-061-NMEX(1)
Contract DI-14-34-0001-0133

New Mexico has vast supplies of saline groundwaters whose use could expand irrigated agriculture and conserve good quality water for domestic use. Unfortunately, little is known of the long-term effects of such waters on soils and crops common to New Mexico. Thus, two studies were conducted to determine the feasibility of using various salinity waters (total dissolved solids 1,250-15,000 mg/l). Greenhouse data suggest that the most realistic way to utilize saline waters is as supplements to normal fresh water irrigations. However, very saline waters (10,000 and 15,000 mg/l TDS) are not likely to be of practical use for common agricultural crops at any degree of supplementation.

PB81-148066 PC **A03**/MF **A01**
Nebraska Water Resources Center, Lincoln.
An Economic Evaluation of the Feasibility of Artificial Ground Water Recharge in Nebraska.
Project completion rept.,
Raymond J. Supalla, and Dorothy A. Comer. Jan 81, 35p W81-01155, OWRT-A-065-NEB(1)
Contract DI-14-34-0001-9029

The purpose of this project was to analyze the economic feasibility of recharge for irrigation use. This involved developing a procedure for estimating recharge benefits, application of the benefit estimating procedure to a proposed Nebraska case, and a review of the literature regarding recharge program costs. The benefit estimating procedure considers two types of benefits; those due to reduce pumping lifts and those due to extended aquifer life.

2D. Agronomy and Horticulture

PB81-151185 PC **A06**/MF **A01**
ACTION/Peace Corps, Washington, DC.
Rice Production: A Training Manual and Field Guide to Small-Farm Irrigated Rice Production.
Information collection and exchange reprint series,
Michael L. Morris. Jul 80, 104p REPRINT R-40

This manual presents a simple, step-by-step description of irrigated rice production in Sierra Leone. It is geared specifically to the role and needs of Peace Corps Volunteers. Placed in rural areas throughout the country, Volunteers work with local farmers as advisors, co-workers, and friends in helping introduce a new farming technology: water control agriculture. As extension agents, their role includes surveying undeveloped swamps, designing effective water control systems, and teaching farmers productive and appropriate rice cultivation practices.

2E. Animal Husbandry

PATENT-4 243 686 Not available NTIS
Department of Agriculture, Washington, DC.
Process for Improving the Palatability of Straw for Animal Feed.
Patent,
Cleanthes Israilides, Youn W. Han, and Arthur W. Anderson. Filed 30 May 79, patented 6 Jan 81, 4p PB81-152761, PAT-APPL-6-043 975
Supersedes PB-298 885.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The palatability as well as digestibility and protein content of straw is enhanced by treating it with a dilute aqueous solution of hydrochloric and phosphoric acids, ammoniating the acid-treated straw, and fermenting it with a yeast such as Aureobasidium pullulans. The so-treated straw is useful as a feed for ruminants and other animals.

2F. Forestry

N81-15428/8 PC **A03**/MF **A01**
National Physical Research Lab., Pretoria (South Africa).
Preparation of a Forestry Map of South Africa Using Landsat Data. Phase 1: Feasibility Study.
O. G. Malan, D. W. Vanderzel, and A. J. Brink. Feb 80, 47p CSIR-FIS-207, ISBN-0-7988-1764-X
Original Contains Color Illustrations.

The results of a feasibility study to generate such a foresty map of South Africa from LANDSAT data by computer classification are presented. In view of the highly reliable results obtained, even at a scale of 1:50,000, a continuation of the study is recommended.

PB81-148280 PC **A04**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.

Timber Resource of Minnesota's Central Hardwood Unit, 1977.
Forest Service resource bull. (Final),
Alexander Vasilevsky, and Ronald L. Hackett. Jan 81, 71p FSRB-NC-46

The fourth inventory of Minnesota's Central Hardwood Unit shows large gains in growingstock and sawtimber volumes but a 17-percent decline in commercial forest area between 1962 and 1977. This report gives statistical highlights and contains detailed tables of forest area as well as timber volume, growth, mortality, ownership, and use.

PB81-148298 PC **A04**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Timber Resource of Minnesota's Aspen-Birch Unit, 1977.
Forest Service resource bulletin (Final),
John S. Spencer, Jr., and Arnold J. Ostrom. Sep 80, 58p FSRB-NC-43

The fourth inventory of Minnesota's Aspen-Birch Unit shows solid gains in growing-stock and sawtimber volumes between 1962 and 1977, but a 13 percent decline in commercial forest area. This report gives statistical highlights and contains detailed tables of forest area as well as timber volume, growth, mortality, ownership, and use.

PB81-148975 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Yield and Productivity in Processing Tree-Length Softwoods: Mills in Quebec.
Technical rept.,
S. M. Pnevmaticos, Y. Corneau, and R. C. Kerr. 1980, 18p TR-507E
Also pub. as ISSN-0709-4523. Abstract in English and French.

The Eastern Forest Products Laboratory examined five softwood sawmills in Quebec and recorded their lumber recovery and productivity. The sawmill industry in Quebec operates with some of the smallest trees and logs used in the world. Results show that high lumber recovery and productivity can be achieved if proper production procedures are implemented. Lumber recovery factors of over seven board feet per cubic foot of log input were observed while processing over 2,500 trees per shift.

PB81-150559 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Lumber Production by Slicing.
Technical rept.,
J. S. Johnston, and A. St-Laurent. 1980, 20p TR-504E
Also pub. as ISSN-0709-4523. Summary in English and French.

A method for cutting rectangular cross sections of green wood into lumber, using a knife instead of the usual resaw, is described. No kerf material (sawdust) or wood dust is produced. The operation is almost noiseless and since there are few, and only slowly moving, parts, it should be much safer than saws. If this method were applied in sawmills, in conjunction with primary log breakdown by chipper canter, only pulp chips and lumber would be produced.

PB81-150567 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Sawyer Beetles.
Technical rept.,
D. Ostaff. 1979, 11p TR-R508E
Also pub. as ISSN-0709-4523. Summary in English and French.

The larvae (grubs) of sawyer beetles riddle sawlogs with large, elliptical worm-holes, which facilitate the entrance of stain and decay fungi. Larval mines penetrate to depths from 100 to 150 mm. Development from egg to adult requires 1 or 2 years but may take up to 3 or 4 years. Logs cut in May and early June, as well as fire-killed trees are highly susceptible to attack. Logging management is the best method of controlling sawyer beetles.

PB81-150666 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Comment Reduire les Pertes de Billes et de Sciages Dues Aux Insectes Perce-Bois (How to Reduce the Loss of Timber and Sawing Due to Wood Boring Insects),
D. Ostaff, and J. K. Shields. 1979, 18p 502F
Also pub. as ISSN-0709-4523. Text in French. Summary in English.

Logs and lumber are subject to attack by various wood-boring insects. In eastern Canada one of the most important insect species is Monochamus spp., sawyer beetles. Prompt utilizatation of logs before mid-August of the first year after cutting (provided the trees were alive or recently killed at time of felling) prevents most worm-hole damage. Lumber destined for export markets should not contain live borers.

PB81-151672 PC **A03**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
The Role and Use of Fire in the Semidesert Grass-Shrub Type.
Forest Service general technical rept.,
Henry A. Wright. Jul 80, 31p FSGTR/INT-85

The report summarizes current knowledge about the effect of fire on vegetation in the semidesert grass-shrub type. Coverage includes, southeastern Arizona, southern New Mexico, and southwestern Texas where grasslands in the southern desert were once prevalent.

PB81-153470 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
The Transmission of Oak Wilt.
Forest Service research paper (Final),
J. N. Gibbs, and D. W. French. Jan 81, 22p FSRP-NC-185

The report provides an up-to-date review of factors affecting the transmission of oak wilt, Ceratocystis Fagacearum. It discusses the history and severity of the disease, the saprophytic existence of the fungus in the dying tree, seasonal susceptibility of trees to infection, overland and underground spread, the role of animals and insects as vectors or tree wounders, and the distribution of the disease.

PB81-153835 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Dimension Yields from Short Logs of Low-Quality Hardwood Trees.
Forest Service research paper (Final),
Howard N. Rosen, Harold A. Stewart, and David J. Polak. Jan 81, 28p FSRP-NC-184

Charts are presented for determining yields of 4/4 dimension cuttings from short hardwood logs of aspen, soft maple, black cherry, yellow-poplar, and black walnut for several cutting grades and bolt sizes. Cost comparisons of short log and standard grade mixes show the estimated least expensive choice for a specific cutting bill.

PB81-153850 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Predicted Yields from Selected Cutting Prescriptions in Northern Minnesota.
Forest Service research paper (Final),
Pamela J. Jakes, and W. Brad Smith. Jan 81, 33p FSRP-NC-188

The report includes predicted yields based on two sets of cutting prescriptions in northern Minnesota. It also indicates that given a specific set of assumptions, average annual growing-stock removals for the decade 1977-1986 would be from 69 percent to 124 percent higher than 1976 growing-stock removals.

PB81-153868 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Strip Clearcutting to Regenerate Northern Hardwoods.
Forest Service research paper (Final),
Frederick T. Metzger. Jan 81, 20p FSRP-NC-186

The report describes results of strip clearcutting trials in mature northern hardwood and hemlock-hardwood stands in the Lake States. Two strip widths and orientations were tested, with and without herbicide treatment of the advance regeneration. Establishment, growth, and species composition of the regeneration were assessed.

PB81-154999 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Lake States Primary Forest Industry and Timber Use, 1975.
Forest Service resource bull. (Final),
James E. Blyth, James H. Whipple, Allen H. Boelter, and Steven Wilhelm. Jan 81, 42p FSRB-NC-49

The report discusses industrial roundwood production and forest industry trends in Michigan, Minnesota, and Wisconsin. Also it compares log and bolt production by State for several products and species and discusses primary wood-using mill residue and its use.

PB81-155178 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Evaluating Stocking in Upland Hardwood Forests Using Metric Measurements.
Forest Service research paper (Final),
Robert Rogers. Jan 81, 9p FSRP-NC-187
Errata sheet inserted.

The report allows stocking percent in upland forests to be calculated when tree and stand variables are measured in the metric system.

3.

ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N81-15913/9 PC **A03**/MF **A01**
Institute for Advanced Study, Princeton, NJ.
Guide Star Probabilities.
Final rept.,
R. M. Soneira, and J. N. Bahcall. Jan 81, 34p
NASA-CR-3374, M-321
Contract NAS8-32902

Probabilities are calculated for acquiring suitable guide stars (GS) with the fine guidance system (FGS) of the space telescope. A number of the considerations and techniques described are also relevant for other space astronomy missions. The constraints of the FGS are reviewed. The available data on bright star densities are summarized and a previous error in the literature is corrected. Separate analytic and Monte Carlo calculations of the probabilities are described. A simulation of space telescope pointing is carried out using the Weistrop north galactic pole catalog of bright stars. Sufficient information is presented so that the probabilities of acquisition can be estimated as a function of position in the sky. The probability of acquiring suitable guide stars is greatly increased if the FGS can allow an appreciable difference between the (bright) primary GS limiting magnitude and the (fainter) secondary GS limiting magnitude.

3B. Astrophysics

AD-A093 593/2 Not available NTIS
Stanford Univ., CA. Inst. for Plasma Research.
Doppler Observations of Solar Rotation,
P. H. Scherrer, and J. M. Wilcox. 29 Feb 80, 3p
Contract N00014-76-C-0207, Grant NGR-05-020-559
Supersedes Rept. no. SU-IPR-804, AD-A083 031.
Sponsored in part by Grants NGR-05-020-559 and NSF-ATM77-20580.
Availability: Pub. in The Astrophysical Jnl., v239 n2 pt2 pL89-L90, 15 Jul 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 661/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Neutral Hydrogen Observations of Smooth Arm Spiral Galaxies,
M. S. Wilkerson. 20 Aug 79, 9p Rept no. AFGL-TR-80-0369
Pub. in The Astrophysical Jnl., v240 pL115-L119, 15 Sep 80.

No abstract available.

AD-A093 745/8 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
The Ionospheric Response to Solar Flares. I. Effects of Approximations of Solar Flare EUV Fluxes
Memorandum rept.
Elaine S. Oran, and John T. Mariska. 16 Jan 81, 23p Rept no. NRL-MR-4428

SOLRAD and many other satellite systems have provided a large data base showing the time-dependent behavior of broad and band solar fluxes in the X-ray and EUV spectral regions. These bands are broad in the sense that one band may contain many ionospherically important spectral lines. We present results of tests performed to determine how this information can be best be used to predict the effects of a solar flare on the ionosphere. Our approach has been to first adopt a model of the spectral line and continuum enhancements based on a synthesis of many types of flare observations. This detailed spectral model is used in a time-dependent ionosphere model to calculate the response of the electron and ion density profiles. Then the spectral model is mathematically filtered to show how it would appear to the SOLRAD EUV detectors, and this degraded information is used in the ionosphere model. Comparison of the two ionosphere shows that the two spectra produces changes in the total electron content in the ionosphere that differ by only a few percent. More significant changes which occur in the individual species densities are described. (Author)

AD-A093 764/9 PC **A02**/MF **A01**
Aerospace Corp., El Segundo, CA. Lab. Operations.
Size of the X-Ray Kernel of the Large 1979 August 20 Solar Flare.
Interim rept.,
Peter B. Landecker, and David L. McKenzie. 28 Nov 80, 21p TR-0081(6960-01)-1, SD-TR-80-82
Contract F04701-80-C-0081

At the time of the intense Class X5 solar flare on 1979 August 20, monochromatic small raster maps near 7 A were recorded of the flaring active region with 20-in. resolution (FWHM) by the SOLEX Solar X-Ray Spectrometer/Spectroheliograph. From these maps, the spatial extent of the x-ray kernel during the rise of this flare at about 0912 UT was determined to be less than 28 inches. The electron density in the hot flare plasma was estimated to be above 10 to the 11th power/cu cm. This is the first soft x-ray measurement of the angular size of such an intense flare.

AD-A093 792/0 PC **A10**/MF **A01**
Army Military Personnel Center, Alexandria, VA.
Fourier Transformation Theory for Averaged Functions, with Application to Very Long Baseline Radio Interferometry.
Master's thesis,
Robert John Bonometti. Feb 81, 206p

This thesis investigates the effects on brightness function resolution when the visibility function is truncated and averaged. The causes of truncation and averaging (which arise in cases where satellites are incorporated as interferometer elements) are presented, and the basic Fourier transform relation between the visibility and brightness functions is reviewed. The standard Fourier transform method, which is based on a generalization of the Sampling (or Nyquist) theorem and does not account for the effects of truncation and averaging, is presented. The effects of truncation and averaging are illustrated for a double Gaussian model source using the standard Fourier inversion method. Theorems concerning the Fourier transformation of a truncated and/or averaged visibility function are then developed, and an algorithm based on this study is developed. This algorithm attempts to enhance resolution by using a derived relationship between an average value of the visibility function and the true source brightness function. The algorithm is applied to several one-dimensional test cases to illustrate its potential. (Author)

AD-A093 885/2 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Sunspots: Power Spectra and a Forecast.
Interim rept.,
Paul F. Fougere. 15 May 79, 11p Rept no. AFGL-TR-79-0104

High resolution power spectra of the Zurich sunspot numbers for the period 1849 to 1978 are obtained using the maximum entropy technique of Burg. The monthly means are first smoothed using a digital, least-squares, band-pass filter with 193 weights, and then decimated to obtain a more manageable series. An overall power spectrum, which displays multiple structure and harmonic series is then obtained. In order to explain the complications in the spectrum, a dynamic spectrum is displayed. This is obtained by finding the spectra of data samples 66 years long, repeatedly slipped by 2 years for a total of 78 spectra. The spectra are then much simpler and vary smoothly with epoch. The nominal 11-year line varies in period from about 10 to 12 1/2 years. In the process of obtaining a power spectrum a prediction error filter is derived. This linear filter may then be used to make predictions as follows: using sets of data containing 5 solar cycles of unsmoothed monthly values beginning with cycles 9 through 15, predictions of the next 12 months of the time series are made and compared to the observed values. RMS errors vary between 5 and 33 and lead to an expectation that the error of prediction for cycle 21 will be about 20. The entire cycle 21 is then predicted using 50, 100, 150 prediction error coefficients. The maximum of cycle 21 is predicted to be 130 + or - 20 at 1980 .1 + or - 0.2. (Author)

AD-514 827/5 PC **A14**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Aerospace Div.
System and Instrument Design for an Earth Limb Measurements Program.
Final rept. 1 Apr 69-1 Jan 70,
Robert M. Carlson, Joseph S. Titus, and Glenn H. Wise. 15 Apr 71, 311p AFCRL-70-0496
Contract F19628-69-C-0258, Grant ARPA Order-1366
Distribution limitation now removed.

Requirements for a spectral radiometer to measure the earth limb in the long-wavelength infrared have been established. Temporal and spatial sampling requirements for an experimental program to define the variation in the limb radiance have been investigated. An experimental program using probes has been designed to meet these requirements. The conceptual design of a long-wavelength infrared spectral radiometer is included in the experiment design. (Author)

LA-UR-80-2870 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Effect of Rotation on the Hydrodynamics of Stellar Collapse.
J. E. Tohline, J. M. Schombert, and A. P. Boss. 1980, 7p CONF-800372-13
Contract W-7405-ENG-36
International astronomical union colloquium 58 on stellar hydrodynamics, Los Alamos, NM, USA, Aug 1980.

To date, most of the hydrodynamic calculations that have followed the details of the physics during an iron core collapse have been restricted to spherical symmetry and therefore have neglected the role that rotation may play in the hydrodynamics of the collapse. If rotation is important, the core will flatten to an oblate spheroidal shape allowing some loss of energy through gravitational radiation; the core could conceivably, dynamically evolve to a toroidal configuration, as has been observed in some models of rotating protostellar clouds; and it may, through a rotational instability, eventually evolve into a non-axisymmetric structure. It is important to know just how much rotational energy must be present in the pre-collapse core in order for these, or any other significant deviations from spherical symmetry, to become important considerations during a core collapse. (ERA citation 06:006667)

N81-15829/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
The Structure of Correlation Tensors in Homogeneous Anisotropic Turbulence.
W. H. Matthaeus, and C. Smith. Dec 80, 29p NASA-TM-82058
Grant NSG-7416
Submitted for Publication.

The study of turbulence with spatially homogeneous but anisotropic statistical properties has applications in space physics and laboratory plasma physics. The first step in the systematic study of such fluctuations is the elucidation of the kinematic properties of the relevant statistical objects, which are the correlation tensors. The theory of isotropic tensors, developed by Robertson, Chandrasekhar and others, is reviewed and extended to cover the general case of turbulence with a pseudo-vector preferred direction, without assuming mirror reflection invariance. Attention is focused on two point correlation functions and it is shown that the form of the decomposition into proper and pseudo-tensor contributions is restricted by the homogeneity requirement. It is also shown that the vector and pseudo-vector preferred direction cases yield different results. An explicit form of the two point correlation tensor is presented which is appropriate for analyzing interplanetary magnetic fluctuations. A procedure for determining the magnetic helicity from experimental data is presented.

N81-15907/1 PC **A23**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Reports of Planetary Geology Program, 1980.
H. E. Holt, and E. C. Kosters. Dec 80, 544p
NASA-TM-82385

This is a compilation of abstracts of reports which summarize work conducted in the Planetary Geology Program. Each report reflects significant accomplishments within the area of the author's funded grant or contract.

N81-15914/7 PC **A02**/MF **A01**
Denver Univ., CO. Dept. of Physics.
Velocity Fields and Spectrum Peculiarities in beta Cephei Stars.
Final Technical rept., May 1979 - Nov. 1980.
J. R. Lesh. Nov 80, 6p NASA-CR-163860
Grant NSG-5367

The acquisition of short wavelength spectra of Beta Cephei variable stars from the International Ultraviolet Explorer is reported. A total of 122 images of 10 variable stars and 3 comparison stars were obtained. All of the images were observed in the high dispersion mode through a small aperture. The development of image processing methods is also briefly discussed.

N81-15923/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
The Jovian Magnetotail and Its Current Sheet.
K. W. Behannon, L. F. Burlaga, and N. F. Ness. Oct 80, 69p NASA-TM-80719
Submitted for Publication.

Analyses of Voyager magnetic field measurements have extended the understanding of the structural and temporal characteristics of Jupiter's magnetic tail. The magnitude of the magnetic field in the lobes of the tail is found to decrease with Jovicentric distance approximately as r to he-1.4, com-

pared with the power law exponent of -1.7 found for the rate of decrease along the Pioneer 10 outbound trajectory. Voyager observations of magnetic field component variations with Jovicentric distance in the tail do not support the uniform radial plasma outflow model derived from Pioneer data. Voyager 2 has shown that the azimuthal current sheet which surrounds Jupiter in the inner and middle magnetosphere extends tailward (in the anti-Sun direction) to a distance of at least 100 R sub J. In the tail this current sheet consists of a plasma sheet and embedded neutral sheet. In the region of the tail where the sheet is observed, the variation of the magnetic field as a result of the sheet structure and its 10 hr periodic motion is the dominant variation seen.

N81-15924/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Standing Alfven Wave Current System at IO: Voyager 1 Observations.
M. H. Acuna, F. M. Neubauer, and N. F. Ness. Dec 80, 32p NASA-TM-82060

The enigmatic control of the occurrence frequency of Jupiter's decametric emissions by the satellite Io is explained theoretically on the basis of its strong electrodynamic interaction with the corotating Jovian magnetosphere leading to field aligned currents connecting Io with the Jovian ionosphere. Direct measurements of the perturbation magnetic fields due to this current system were obtained by the magnetic field experiment on Voyager 1 on 5 March 1979 when it passed within 20,500 km south of Io. An interpretation in the framework of Alfven waves radiated by Io leads to current estimates of 2.8 million amps. A mass density of 7400 to 13600 proton mass units per Cu cm is derived which compares very favorably with independent observations of the torus composition characterized by 7-9 proton mass units per electron for a local electron density of 1050 to 1500 per cu cm. The power dissipated in the current system may be important for heating the Io heavy ion torus, inner magnetosphere, Jovian ionosphere, and possibly the ionosphere or even the interior of Io.

N81-15927/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Type 2 Solar Radio Events Observed in the Interplanetary Medium. Part 1: General Characteristics.
H. V. Cane, R. G. Stone, J. Fainberg, J. L. Steinberg, and S. Hoang. Nov 80, 24p NASA-TM-82049
Submitted for Publication.

Twelve type 2 solar radio events were observed in the 2 MHz to 30 kHz frequency range by the radio astronomy experiment on the ISEE-3 satellite over the period from September 1978 to December 1979. These data provide the most comprehensive sample of type 2 radio bursts observed at kilometer wavelengths. Dynamic spectra of a number of events are presented. Where possible, the 12 events were associated with an initiating flare, ground based radio data, the passage of a shock at the spacecraft, and the sudden commencement of a geomagnetic storm. The general characteristics of kilometric type 2 bursts are discussed.

N81-15928/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
On the Theory of Coronal Heating Mechanisms.
M. Kuperus, J. A. Ionson, and D. S. Spicer. Dec 80, 66p NASA-TM-82057
Submitted for Publication.

Theoretical models describing solar coronal heating mechanisms are reviewed in some detail. The requirements of chromospheric and coronal heating are discussed in the context of the fundamental constraints encountered in modelling the outer solar atmosphere. Heating by acoustic processes in the 'nonmagnetic' parts of the atmosphere is examined with particular emphasis on the shock wave theory. Also discussed are theories of heating by electrodynamic processes in the magnetic regions of the corona, either magnetohydrodynamic waves or current heating in the regions with large electric current densities (flare type heating). Problems associated with each of the models are addressed.

N81-15929/5 PC **A03**/MF **A01**
University of Southern California, Los Angeles.
The Five-Minute Oscillations: What's Left to Be Done.
E. J. Rhodes, Jr., R. K. Ulrich, J. W. Harvey, and T. L. Duvall, Jr. 1980, 45p NASA-CR-163849
Grant NSG-7407, Contract NAGW-13

Current observational methods for studying these oscillations at large horizontal wavenumbers are discussed in detail and several two dimensional power spectra obtained with a CID camera on the main spectrograph of the McMath telescope at Kitt Peak National Observatory are described. The best-resolved observations of the p-mode obtained at chromospheric elevations are also presented. Recent progress in studies of the p-modes at low wavenumbers with full-disk velocity detection schemes is summarized. These full-disk observations of radial and low-degree non-radial modes were shown to place severe constraints on the theoretical calculation of solar interior structure. Progress in making fully-consistent solar models which fit both the high- and low-wave number observations is described. Finally, the observational and theoretical improvements that are necessary for further progress in solar seismology are summarized.

N81-15935/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Two Component X-Ray Emission from RS CVn Binaries.
J. H. Swank, N. E. White, S. S. Holt, and R. H. Becker. Nov 80, 23p NASA-TM-82045
Submitted for Publication.

A summary of results from the solid state spectrometer on the Einstein Observatory for 7 RS CVn binaries is presented. The spectra of all require two emission components, evidenced by line emission characteristic of plasma at 4 to 8 x 10 to the 6th power and bremsstrahlung characteristic of 20 to 100 x 10 to the 6th power K. The data are interpreted in terms of magnetic coronal loops similar to those seen on the Sun, although with different characteristic parameters. The emission regions could be defined by separate magnetic structures. For pressure less than approximately 10 dynes/sq cm the low temperature plasma would be confined within the stellar radii, while the high temperature plasma would, for the synchronous close binaries, fill the binary orbits. However, for loop pressures exceeding 100 dynes/sq cm, the high temperature components would also be confined to within the stellar radii, in loops covering only small fractions of the stellar surfaces. While the radio properties and the occurrence of X-ray flares suggest the larger emission regions, the observations of time variations leave the ambiguity unresolved.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A093 466/1 PC **A07**/MF **A01**
Atmospheric and Environmental Research, Inc., Cambridge, MA.
Investigation of the Effect of Low Level Maritime Haze on DMSP VHR and LF Imagery.
Final rept. 1 Apr-30 Sep 80,
Ronald G. Isaacs. 9 Sep 80, 128p
Contract N00014-80-C-0262

An efficient modeling approach is described to simulate the dependence of remotely sensed radiances at visible and near infrared wavelengths (04.-1.1 micrometers) on meteorological variables such as relative humidity, wind speed, and visual range. Model elements include: (1) atmospheric opacity due to Rayleigh scattering and gaseous absorption, (2) physical modeling of aerosol size distribution, (3) aerosol optical properties calculations, and (4) implementation of radiative transfer theory. Sensitivity analyses are performed for these variables in the context of examining modeled meteorological influences in the marine environment on the DMSP VHR and LF sensors. The sensitivity of emergent radiances in the near infrared spectral windows to the presence of relative humidity and wind speed dependent coarse mode aerosols of oceanic origin is demonstrated. (Author)

AD-A093 486/9 PC **A05**/MF **A01**
California Univ., Riverside. Statewide Air Pollution Research Center.
Atmospheric Chemistry of Hydrazines: Gas Phase Kinetics and Mechanistic Studies.
Final rept. Sep 78-Jun 80,
James N. Pitts, Jr., Ernesto C. Tuazon, William P. L. Carter, Arthur M. Winer, and Geoffrey W. Harris. Aug 80, 90p AFESC/ESL-TR-80-39
Contract F08635-78-C-0307

Relatively little work has been done on the atmospheric chemistry of nitrogen-containing compounds such as amines and hydrazines, which are widely used in industrial and military applications. However the discovery of compounds such as N-nitrosamines in the environment and concern regarding their impact on man indicate the need to further elucidate the role of nitrogenous compounds in the atmosphere. The Air Force is presently assessing the environmental impact of the Space Transportation System which uses hydrazines as one of the fuels. In addition, hydrazine is used as a propellant in the F-16 for emergency power. Both uses will result in potential atmospheric releases which should be controlled to a degree dictated by the impact of hydrazines on ambient air quality. Thus, the present study wa designed to experimentally evaluate the atmospheric fate of unsubstituted hydrazine (N2H4), monomethylhydrazine (MMH), and unsymmetrical dimethylhydrazine (UDMH).

AD-A093 595/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Midlatitude Measurements of the Thermospheric Neutral Wind during the ALADDIN Programme,
D. Rees, P. A. Rounce, G. T. Best, and A. F. Quesada. 23 Mar 78, 10p Rept no. AFGL-TR-80-0368

No abstract available.

AD-A093 649/2 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
Improved Data Reduction and Analysis System for Blunt Probe and Gerdien Condenser Measurements.
Final rept.,
Darryl C. Schroder. Oct 80, 121p ERADCOM/ASL-CR-80-0100-3
Contract DAAD29-76-D-0100

Measurements of electrical conductivity over the altitude range of 20 km to 80 km have been obtained by the deployment of a blunt probe of Gerdien condenser sensor from a small meteorological rocket. The sensors are deployed from the rocket vehicle at apogee and descend subsonically from altitudes as great as 80 km down to 20 km. This report discusses the development of a data reduction technique for the analysis of atmospheric electrical conductivity utilizing a computer software program and hardware components. A comparison test of the improved computer reduction technique with prior manual/computer reduction method indicates the improved reduction technique results in data with greater accuracy and increases the data yield to higher altitudes. (Author)

AD-A093 709/4 PC **A03**/MF **A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.

Initial Field Measurements of Atmospheric Absorption at 9 Micrometers to 11 Micrometers Wavelengths.
Final rept.,
Charles W. Bruce, Young Paul Yee, B. D. Hinds, R. G. Pinnick, and Ralph J. Brewer. Oct 80, 34p Rept no. ERADCOM/ASL-TR-0068

A field-adapted spectrophone system employing a tunable CO2 laser source (over wavelengths 9.2 micrometers to 10.8 micrometers was used to measure atmospheric gaseous and particulate absorption at an isolated desert southwestern location in the United States. Measurements were made both for ambient conditions (when aerosol particulate absorption was negligible compared to that of gases) and for dusty conditions resulting from vehicular traffic. For ambient conditions, the gaseous absorption coefficient varied with time from expected levels upward by as much as a factor of 3. Sources which could be correlated with increased absorption are discussed. For dusty conditions the spectrophone data were compared with estimates of the absorption coefficient calculated on the basis of measured particle size distributions together with estimates of particle complex indices of refraction. Temporal variation of the absorption coefficient correlated closely for the two methods, while the calculated values were generally higher. Sampling and calculational uncertainties are suggested as likely to be responsible for this discrepancy. (Author)

AD-A093 713/6 PC **A02**/MF **A01**
Columbia Univ., New York.
Gravity and Acoustic Waves Applied to the Dynamics and Kinematics of the Atmosphere.
Final rept. 15 May 74-1 Nov 80,
William L. Donn, and Nambath K. Balachandran. Dec 80, 15p ARO-12286.3-GS, ARO-14846.11-GS
Grants DAAG29-74-G-0172, DAAG29-77-G-0131

A generalized review of the work accomplished in the direct and spin-off areas supported over the past six years in the following areas is presented: (1) Use of infrasound as an Atmospheric Probe: Infrasonic signals from natural and artificial sources were used as a passive probe of the atmosphere. (2) Gravity Wave Program: In this study, an array of sensitive microbarographs (microbarovariographs) is used rather than microphones. Results so far show that surface gravity waves were related to the presence of wind shear aloft and often constitute continuous background perturbations. Gravity waves also shown to characterize the approach of warm fronts aloft, often well before the advent of precipitation and other storm features. Gravity waves were also shown to be of possible importance in generating thunderstorms through the triggering action at times unstable or conditionally unstable conditions. (Author)

AD-A093 714/4 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Coordinated Study of Equatorial Scintillation and In Situ and Radar Observations of Nighttime F Region Irregularities,
Santimay Basu, J. P. McClure, Sunanda Basu, W. B. Hanson, and J. Aarons. 17 Mar 80, 14p Rept no. AFGL-TR-80-0376
Pub. in Jnl. of Geophysical Research, v85 nA10 p5119-5130, 1 Oct 80.

No abstract available.

AD-A093 719/3 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Mid-Latitude Winter Nighttime Increases in the Total Electron Content of the Ionosphere,
E. A. Essex, and J. A. Klobuchar. 26 Jul 79, 12p Rept no. AFGL-TR-80-0375
Pub. in Jnl. of Geophysical Research, v85 nA11 p6011-6020, 1 Nov 80.

No abstract available.

AD-A093 765/6 PC **A02**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
VLF Emissions from a Modulated Electron Beam in the Auroral Ionosphere.
Final rept.,
Robert H. Holzworth, and Harry C. Koons. 15 Nov 80, 21p TR-0081(6960-05)-1, SD-TR-80-77
Contract F04701-80-C-0081

A discrete VLF frequency of 3 kHz was successfully radiated by a modulated electron beam on a rocket launched into an active aurora. Instrumentation on this flight included a programmable electron accelerator on the aft section with various particle and field detectors on the aft section as well as the ejected forward payload. The accelerator programmer included a current modulation period at fixed electron energy for 0.45 seconds duration approximately every 11 seconds throughout the flight. (Author)

AD-A093 872/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
High-Time Resolution Study of the September 21, 1977 Sudden Commencement Using AFGL Magnetometer Data.
Interim rept.,
Paul F. Fougere. 15 May 79, 7p Rept no. AFGL-TR-79-0105

An SSC, following a solar flare of importance 3B, is seen to travel across the AFGL Magnetometer Network from west to east. The disturbance flattens and decays of it propagates like a plane wave with the stations responding in order of their distance from the sub-solar point. (Author)

AD-A093 927/2 PC **A04**/MF **A01**
Nevada Univ., Reno. Desert Research Inst.
Characteristics of Atmospheric Ice Particles: A Survey of Techniques.
Final rept. Jan-Sep 80,
John Hallett. Sep 80, 63p AFGL-TR-80-0308
Contract F19628-80-C-0054

A survey is given of properties of ice particles in the atmosphere necessary to assess the design of aircraft instrumentation required for their characterization. A critical review is given of current aircraft instrumentation from the view point of representative data acquisition in a realistic time frame, in particular techniques for mass and size distribution are examined. It is concluded that two as yet untried techniques utilizing particle accretion and evaporation show promise for measurement of mass distribution. (Author)

AD-A093 928/0 PC **A05**/MF **A01**
Rice Univ., Houston, TX.
Study of Magnetospheric Currents and Resultant Surface Magnetic Variations.
Final rept. 1 Oct 76-1 Feb 80,
C. -K Chen, R. A. Wolf, M. Harel, J. L. Karty, and R. W. Spiro. 17 Apr 80, 82p AFGL-TR-80-0139
Contract F19628-77-C-0005

We have completed computer simulations of the inner magnetosphere, for the substorm-type event of 19 September 1976. Several computer runs have been performed, with various sets of input parameters. Data from the Air Force S3-2 satellite and ground magnetometers were used for model inputs. Model predictions were analyzed and exhaustively compared with data from the S3-2 satellite, the AFGL magnetometer chain and many other sources. Agreement between theory and data was very satisfactory in most respects. The model injected a realistic ring current during the substorm. Many features of various types of observations were correctly predicted by the model, which was then used to suggest physical interpretations of the features. The predicted latitudinal distribution of region-2 Birkeland currents disagrees with S3-2 observations in a way that appears to be independent of details of the model, input inaccuracies, etc. Some implications of this discrepancy for the theory of the plasma sheet and magnetospheric substorms have been worked out. The computed total Joule heating rate in our modeling region is larger than would be estimated by a standard method, and the time-integrated Joule heating rate is about twice the change in model ring-current energy. Recently, our program has been converted for use in modeling a magnetic storm and one run has been made through the first few hours of the magnetic storm of 29 July 1977. A realistic model ring current was injected in the first few hours after the sudden commencement.

AD-A094 010/6 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Plasma Waves Associated with Energetic Particles Streaming into the Solar Wind from the Earth's Bow Shock.
Progress rept. for period ending Jul 80,
R. R. Anderson, G. K. Parks, T. E. Eastman, D. A. Gurnett, and L. A. Frank. 8 Dec 80, 61p Rept no. U OF IOWA-80-40
Contract N00014-76-C-0016

In the upstream solar wind, three dominant types of plasma waves are observed associated with energetic particle streams coming from the earth's bow shock: ion-acoustic waves, electron plasma oscillations, and whistler-mode waves. The ion-acoustic waves occur simultaneously with either ion beams or a dispersed ion population in the energy range from approximately 0.5 to greater than 45 keV. These short-wavelength electrostatic waves are very impulsive and the peak amplitudes increase with increasing ion flux and at spatial gradients in the energetic ion densities. The electon plasma oscillations are long-wavelength nearly monochromatic electrostatic wave which are closely correlated with the flux of low energy electrons, especially in the 0.2 - 1.5 keV range. In the presence of only enhanced electron fluxes, the average amplitudes of the electron plasma oscillations approach the peak amplitudes. (Author)

AD-A094 018/9 PC **A03**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Electrical Engineering and Computer Science.
Lowtran V Subroutine for the Calculation of Intensity Deviation for Point and Finite Aperture Receivers.
Final rept. 2 Jan 79-30 Jun 80,
C. F. Ouyang, M. A. Plonus, and S-J Wang. Sep 80, 29p AFGL-TR-80-0297
Contract F19628-79-C-0068

This report describes a coded subroutine for predicting atmospheric transmittance deviation due to the turbulence effect. This subroutine is designed to be used with Lowtran V. The calculation of transmittance deviation is for point receivers as well as for finite aperture receivers which exhibit the aperture averaging effect. (Author)

AD-B006 666/2 PC **A03**/MF **A01**
Air Force Cambridge Research Labs., Hanscom AFB, MA.
Final Report of STM-8W Weather Documentation, AFCRL/Minuteman Report Number 3.
Air Force surveys in geophysics,
James I. Metcalf, Arnold A. Barnes, Jr., and Michael J. Kraus. 11 Apr 75, 34p Rept nos. AFCRL-TR-75-0207, AFCRL-AFSG-308
Errata sheet inserted.
Distribution limitation now removed.

Reentry weather encountered by Minuteman test STM-8W is described. Documentation was accomplished by WB-57F aircraft, by satellite, by radar, and by lidar. A thin cloud layer was present at about 8.5 km with ice water content about 0.003 gm/cu m, and one at 5.5 km had about 0.002 gm/cu m. Low-level cumulus clouds were observed below 3 km on two of the trajectories. Data from all sources are presented, and operational problems of the weather documentation plan are discussed. (Author)

N81-15616/8 PC **A03**/MF **A01**
Systems and Applied Sciences Corp., Riverdale, MD.
Two-Dimensional Zonal Mean Flow Model.
Final rept.,
H. C. Chen. Feb 79, 49p NASA-CR-160071, R-SAN-27901
Contract NAS5-25061

The interactions of dynamics, photochemistry and radiation in the stratosphere can be described by the continuity, momentum, and energy equations. A more comprehensive model for stratospheric transport theory was developed for the purpose of aiding predictions of changes in the stratospheric ozone content as a consequence of natural and anthropogenic processes. This model is time dependent and the dependent variables are zonal means of the relevant meteorological quantities which are functions of latitude and height. The detailed formulation of a numerical model both in physics and mathematics is given. A set of fundamental dynamical equations, and the numerical method used in the integration are described.

N81-15628/3 PC **A03**/MF **A01**
Centre National de Recherches de l'Espace, Brussels (Belgium).
Space Research in Belgium la Recherche Spatiale en Belgique.
1980, 37p
Text in French. Presented at 23RD Cospar Plenar Meeting, Budapest, 2-14 Jun. 1980.

Research from five major facilities in Belgium is reported along with lists of publications from each of the facilities. Research topics include studies in the upper atmosphere, especially atmospheric attenuation and composition. Atmospheric models were developed to study nightglow, heat flux, and atmospheric physics. Research in aeronomy and astrophysics is also reported.

4B. Meteorology

AD-A093 536/1 PC **A02**/MF **A01**
Naval Oceanography Command Detachment, Asheville, NC.
Inventory of Marine Upper Air Observations for Moving Ships and Ocean Station Vessels.
Nov 80, 11p

The inventory contains observation counts for radiosonde and rawinsonde observations taken over the marine areas excluding land and island stations. The marine inventory is tabulated into 5 deg/ Long squares with the number of observations given for the period of record 1946-1979.

AD-A093 646/8 PC **A02**/MF **A01**
Naval Oceanography Command Detachment, Asheville, NC.
Climatic Publications Prepared for the Commander, Naval Oceanography Command.
Nov 80, 11p

This report deals with: Climatological Publications; Standard Naval Weather Service Summaries, and Special Marine Environmental Studies.

AD-A093 760/7 PC **A05**/MF **A01**
Committee on Tidal Hydraulics (Army), Washington, DC.
Evaluation of Numerical Storm Surge Models.
Final rept.
Dec 80, 87p Rept no. CTH-TB-21

Federal services that minimize loss of life and property due to tropical hurricanes include forecasts and flood warnings. Because of the different concerns of these agencies their models have evolved in different ways and are applied with different input data, and apparent disparities have appeared. Evaluation was accomplished by having each modeling group separately exercise its models for selected past events and by comparing the model outputs with each other and with observed water elevations. Open-coast storm surge models were evaluated, then inland flooding models were evaluated using as input one of the open-coast model results. Each model tested included features that offered important advantages. Further, the models were continually evolving to include improved descriptions of the land and waters and of storms. No one model's predictions consistently gave better comparisons with observed data, however; and it is unlikely that one will be clearly better than the others for Corps purposes.

AD-A093 793/8 PC **A03**/MF **A01**
Systems Control, Inc. (VT), Palo Alto, CA.
Vortex Modeling.
Annual progress rept. Oct 79-0ct 80,
Francis H. Nicholson. Oct 80, 26p Rept no. SCI-5344-AR-01
Contract N00014-80-C-0026

A full numerical model of the typhoon with rigid constraints on the divergence, vorticity and surface pressure fields was tested and found capable of producing realistic forecasts of typhoon development. The constraints on these fields are that the fields are subject to Laplace's equation in both spiral and circular cylindrical coordinates. The zero Laplacian constraint is compatible with a full scale model of the typhoon. Experiments on the role of the Richardson number, critical entrophy and eddy viscosity show their necessity in the creation and maintenance of the separate typhoon regimes. The asymmetric contributions account for the major portion of the divergence and vorticity budgets. New numerical techniques which bypass finite differencing account for significant reduction in storage requirements and in computational time. (Author)

AD-A093 795/3 MF **A01**
Illinois State Water Survey, Urbana.
Boundary Layer Structure and Its Relation to Precipitation Over the St. Louis Area.
Technical rept.,
Gary L. Achtemeier. Oct 80, 237p SWS-CR-241, TR-2, ARO-15529.4-GS
Grant NSF-ATM78-08865
Availability: Microfiche copies only.

Rainfall, wind and temperature data at the surface and winds in the lower 1-2 km for a mesoscale area surrounding St. Louis, Missouri, for 7 summer days in 1975 were used in a study to determine the relationship between the surface kinematic fields and the occurrence and intensity of rainfall, and to determine if the surface kinematic fields are representative of the subcloud layer. It was found that, on some case days, patterns of convergence collocated favorably with raincells, were predictive of rainfall onset, and were positively related with rainfall amount. However, the relationships were nonexistent or negative on other case days. The statistics support the premise of the predictability of rain amount or rain mass based upon the preceding convergence on the cell scale and on the scale of the network, especially if some method that stratifies the convergence-rainfall relations can be found. Subsynoptic and/or mesoscale disturbances that tend to increase the potential for convective precipitation were present on all 7 case study days. These disturbances formed over the dense St. Louis surface network on three case study days. Although occurring under different synoptic conditions, these systems were similar structurally, being strongest near the surface and extending through a depth of 550 to 750 meters. (Author)

AD-A093 796/1 MF **A01**
Illinois State Water Survey, Urbana.
Outflow from a Nocturnal Thunderstorm.
Technical rept.,
Robert W. Scott. Nov 80, 32p SWS-CR-242, TR-3, ARO-15529.5-GS
Grant NSF-ATM78-08865
Availability: Microfiche copies only.

An investigation of a dry nocturnal gust front moving over a dense network of meteorological instruments in east central Illinois is presented. The outflow was generated out of an eastward moving, organized storm system passing north of the network. Although no precipitation was measured in the network, a change from ambient to outflow air was observed in other meteorological parameters more than 100 km south of the point at which the outflow is estimated to have initiated. (Author)

AD-A093 926/4 PC **A03**/MF **A01**
PhotoMetrics, Inc., Lexington, MA.
Digitization and Analysis of Photographic Images of Stratospheric Smoke Trails.
Final rept. 1 Sep 78-30 Jun 80,
Christian A. Trowbridge. 30 Jul 80, 29p PhM-02-80, AFGL-TR-80-0230
Contract F19628-78-C-0227

A program of determination of horizontal wind profiles in the stratosphere is described. Photographic records of sunlight-scattering smoke trail tracers released from rockets were digitized, with the film plane coordinates of the trail centers recorded for input to a computer program that calculates spatial locations of sequences of trail points by vector triangulation. Star field photographs provided highly accurate camera orientations for calibration of the triangulation program. Reconstructed three-dimensional trail positions as a function of time were processed to provide horizontal winds and vertical shear at approximately 10 meter vertical resolution. (Author)

AD-A094 020/5 PC **A05**/MF **A01**
Systems and Applied Sciences Corp., Riverdale, MD.
Computer-Based Weather Research.
Scientific rept. no. 2, 1 Dec 78-30 Nov 79,
Alan M. Gerlach. 29 Feb 80, 84p AFGL-TR-80-0069
Contract F19628-79-C-0033

This report details meteorological research conducted by Systems and Applied Sciences Corporation in several areas: development of a limited-area Numerical Weather Prediction model; comparative test of wind sets; development of mesoscale forecasting software for McIDAS; improvement in satellite data brightness analysis techniques. Also, McIDAS hardware and software capabilities were upgraded and used to support field research activities. (Author)

AD-C021 847/9 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Some Comparisons between Probabilities of Cloud-Free Lines-of-Sight Estimated from Aircraft and from Sky Cover Observations.
Air Force surveys in geophysics,
Iver A. Lund, and Eugene A. Bertoni. 8 Feb 80, 22p AFGL-TR-80-0046, AFGL-AFSG-421, SBIE-AD-E001072
Distribution limitation now removed.

For a period of more than 6 years, aircrews made observations of the presence, or absence, of clouds on lines-of-sight between the aircraft and the surface of the earth. These observations were used to estimate the probability of a cloud-free line-of-sight (CFLOS) from a given altitude at a given angle. The probabilities obtained from observations in the vicinity of six stations in the United States were compared with probabilities estimated from routine sky-cover observations taken by weather observers at these stations. A model was used to transform sky-cover observations to CFLOS probabilities. The estimates obtained from the model were generally higher than those obtained from the aircrews' observations. If it is assumed that probabilities obtained from the samples of aircrew observations are better estimates of the true probabilities than estimates inferred from frequency distributions of sky cover categories, the CFLOS probabilities obtained from the CFLOS model are biased. The CFLOS model will yield CFLOS probabilities for any hour of the day, season of the year, and altitude at any geographical location where routine observations of sky cover, altitude and amount are taken. When the model probabilities are increased to correct for bias, they provide good estimates of true probabilities of a CFLOS. (Author)

N81-15638/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
A Proposed Method for Wind Velocity Measurement from Space.
D. Censor, and D. M. Levine. Nov 80, 37p NASA-TM-82053
Presented at the Usnc/URSI Radio Sci. Meeting, Boulder, Colo., 12-15 Jan. 1981.

An investigation was made of the feasibility of making wind velocity measurements from space by monitoring the apparent change in the refractive index of the atmosphere induced by motion of the air. The physical principle is the same as that resulting in the phase changes measured in the Fizeau experiment. It is proposed that this phase change could be measured using a three cornered arrangement of satellite borne source and reflectors, around which two laser beams propagate in opposite directions. It is shown that even though the velocity of the satellites is much larger than the wind velocity, factors such as change in satellite position and Doppler shifts can be taken into account in a reasonable manner and the Fizeau phase measured. This phase measurement yields an average wind velocity along the ray path through the atmosphere. The method requires neither high accuracy for satellite position or velocity, nor precise knowledge of the refractive index or its gradient in the atmosphere. However, the method intrinsically yields wind velocity integrated along the ray path; hence to obtain higher spatial resolution, inversion techniques are required.

N81-15639/0 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Dept. of Meteorology.
Determination of Wind from Nimbus 6 Satellite Sounding Data.
W. E. Carle, and J. R. Scoggins. Jan 81, 83p NASA-RP-1072, M-329
Contract DAAG29-76-G-0078
Sponsored by NASA.

Objective methods of computing upper level and surface wind fields from NIMBUS 6 satellite sounding data are developed. These methods are evaluated by comparing satellite derived and rawinsonde wind fields on gridded constant pressure charts in four geographical regions. Satellite-derived and hourly observed surface wind fields are compared. Results indicate that the best satellite-derived wind on constant pressure charts is a geostrophic wind derived from highly smoothed fields of geopotential height. Satellite-derived winds computed in this manner and rawinsonde winds show similar circulation patterns except in areas of small height gradients. Magnitudes of the standard deviation of the differences between satellite derived and rawinsonde wind speeds range from approximately 3 to 12 m/sec on constant pressure charts and peak at the jet stream level. Fields of satellite-derived surface wind computed with the logarithmic wind law agree well with fields of observed surface wind in most regions. Magnitudes of the standard deviation of the differences in surface wind speed range from approximately 2 to 4 m/sec, and satellite derived surface winds are able to depict flow across a cold front and around a low pressure center.

N81-15640/8 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Dept. of Meteorology.
A Comparative Analysis of Rawinsonde and Nimbus 6 and Tiros N Satellite Profile Data.
J. R. Scoggins, W. E. Carle, K. Knight, V. Moyer, and N. M. Cheng. Jan 81, 84p NASA-RP-1070, M-327
Contract DAAG29-76-G-0078
Sponsored by NASA.

Comparisons are made between rawinsonde and satellite profiles in seven areas for a wide range of surface and weather conditions. Variables considered include temperature, dewpoint temperature, thickness, precipitable water, lapse rate of temperature, stability, geopotential height, mixing ratio, wind direction, wind speed, and kinematic parameters, including vorticity and the advection of vorticity and temperature. In addition, comparisons are made in the form of cross sections and synoptic fields for selected variables. Sounding data from the NIMBUS 6 and TIROS N satellites were used. Geostrophic wind computed from smoothed geopotential heights provided large scale flow patterns that agreed well with the rawinsonde wind fields. Surface wind patterns as well as magnitudes computed by use of the log law to extrapolate wind to a height of 10 m agreed with observations. Results of this study demonstrate rather conclusively that satellite profile data can be used to determine characteristics of large scale systems but that small scale features, such as frontal zones, cannot yet be resolved.

N81-15641/6 PC **A04**/MF **A01**
Executive Office of the President, Washington, DC.
World Weather Program.
Apr 80, 53p NASA-CR-163861
Sponsored by NASA, Dept. Of Commerce, DOD, Dept. Of State, DOT and NSF.

A brief description of the Global Weather Experiment is presented. The world weather watch program plan is described and includes a global observing system, a global data processing system, a global telecommunication system, and a voluntary cooperation program. A summary of Federal Agency plans and programs to meet the challenges of international meteorology for the two year period, FY 1980-1981, is presented.

N81-15642/4 PC **A08**/MF **A01**
Lockheed Electronics Co., Inc., Houston, TX. Systems and Services Div.
An Assessment of Potential Weather Effects Due to Operation of the Space Orbiting Light Augmentation Reflector Energy System (SOLARES).
N. C. Allen. Apr 78, 154p NASA-CR-160752, JSC-13919
Contract NAS9-15200

Implementation of SOLARES will input large quantities of heat continuously into a stationary location on the Earth's surface. The quantity of heat released by each of the SOLARES ground receivers, having a reflector orbit height of 6378 km, exceeds by 30 times that released by large power parks which were studied in detail. Using atmospheric models, estimates are presented for the local weather effects, the synoptic scale effects, and the global scale effects from such intense thermal radiation.

N81-15727/3 PC **A06**/MF **A01**
Systems and Applied Sciences Corp., Riverdale, MD.
A Program and Data Base for Evaluating SMMR Algorithms.
Final rept.,
28 Sep 79, 110p NASA-CR-160069, R-SAC-79-02
Contract NAS5-25069

A program (PARAM) is described which enables a user to compare the values of meteorological parameters derived from data obtained by the scanning multichannel microwave radiometer (SMMR) instrument on NIMBUS 7 with surface observations made over the ocean. The input to this program is a data base, also described, which contains the surface observations and coincident SMMR data. The evaluation of meteorological parameters using SMMR data is done by a user supplied subroutine. Instruments are given for executing the program and writing the subroutine.

PB81-144727 Not available NTIS
National Bureau of Standards, Washington, DC.
Decomposition of N2O Over Particulate Matter,
Richard E. Rebbert, and Pierre Ausloos. Sep 79, 4p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Geophysical Research Letter 5, n9, p761-764 Sep 78.

Nitrous oxide is shown to undergo both a thermal and a photochemical decomposition at 296 K when it is adsorbed on various dry sands. The photochemical process occurs with light of wavelengths greater than 280 nm where gaseous N2O does not absorb. These results indicate that various types of particulate matter in the troposphere may be responsible for the decomposition of nitrous oxide and hence act as an atmospheric sink for N2O.

PB81-802985 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Shear. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Jan 81, 196p
Supersedes PB80-802994, and NTIS/PS-78/1316.

The phenomena of wind shear effects on aircraft, spacecraft launchings, atmospheric turbulence, and air/water interactions are reviewed in these reports gathered in a worldwide literature survey. (This updated bibliography contains 191 citations, 29 of which are new entries to the previous edition.)

PB81-802993 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Shear. 1976-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1976-Jan 81.
Jan 81, 235p
Supersedes PB80-802986, and NTIS/PS-78/1315. See also 1964-1975, NTIS/PS-78/1314.

The phenomena of wind shear effects in various environments are investigated in these Government-sponsored research reports. Aircraft, spacecraft launchings, atmospheric turbulence, and air/water interactions are among the areas reviewed. (This updated bibliography contains 230 citations, 41 of which are new entries to the previous edition.)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A093 484/4 PC **A02**/MF **A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Fiscal Year 1982 - Air Force Technical Objective Document.
Jan 81, 21p Rept no. AFHRL-TR-80-59
Supersedes Rept. no. AFHRL-TR-79-69 dated Mar 80, AD-A082 492.

This document provides the academic and industrial Research and Development (R/D) community with a summary of the technical area objectives of Air Force research in the field of human resources. The areas covered are Manpower and Force Management, Weapon Systems Logistics Maintenance and Technical Training, and Air Combat Tactics and Training. (Author)

AD-A093 514/8 PC **A03**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Planning and Accountability Systems for EEO and Affirmative Action Policy.
Research rept.,
Richard J. Niehaus, and Denise Nitterhouse. Sep 80, 43p OASN(M/RA/L)-RR-38
Contract N00014-76-C-0932

This paper reviews the managerial, statistical and information management implications of using two standards, relevant labor force (RLF) and civilian labor force (CLF), in EEO and affirmative action planning and accountability. A review is provided of the use of CLF and RLF in Supreme Court decisions related to the Civil Rights Act of 1964. The paper concludes with a description of the Department of Navy EEO Accountability System (DONEAS) which uses both the CLF and RLF standards for internal Navy review.

AD-A093 537/9 PC **A03**/MF **A01**
Coastal Area Planning and Development Commission, Brunswick, GA.
A Coordination, Education, and Mitigation Model for Disaster Preparedness in Coastal Areas.
Summary rept.
Sep 80, 49p
Contract EMW-C-0365

The local elected officials of coastal Georgia have recognized the need for a coordinated disaster preparedness program. As as result, a study was undertaken by the Coastal Area Planning and Development Commission (APDC) to determine the most effective manner of coordinating the array of storm related plans that currently exist in the area. Since most disasters, natural or man-made, are a regional problem, it was determined that preparedness measures should be a regional effort. The need for a coordinative mechanism at the regional level became apparent. In December, 1979, the Coastal APDC met with Federal Emergency Management Agency (FEMA) officials in Washington to discuss the viability of implementing a region-wide disaster preparedness program along the

coast of Georgia. The overall goal of the project was to strengthen local governments' capacity in civil preparedness matters. This was proposed to be accomplished through the direct provision of technical assistance to local governments by substate/regional planning agencies. The Coastal APDC's formal proposal called for a four element program -- planning, mapping, education, and mitigation and was entitled 'Coordination, Education and Mitigation Model for Coastal Georgia Storm Preparedness.' At the time the proposal was submitted to FEMA, it was stressed by the Coastal APDC that the project was unique in approach and possessed the potential for use by FEMA as a nationwide model for disaster preparedness, response, and recovery.

AD-A093 561/9 PC **A04**/MF **A01**
Office of the Deputy Under Secretary of Defense for Research and Engineering (R/AT), Washington, DC.
Department of Defense Basic Research Program.
1 Aug 80, 69p

The goal of this report is to present an overview of the DoD basic research program including the entire range of disciplines of interest to DoD; however, space constraints permit citing only a few specific examples. Consequently, many exciting parts of the program could not be described in detail; this should not be taken to indicate lack of interest or lower priority.

AD-A093 581/7 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Model for an Operational Audit of United States Coast Guard Non-Appropriated Fund Activities.
Master's thesis,
Paul Anthony Dufresne. Sep 80, 188p

Operational auditing is briefly described through an analysis of its development, nature, and the relationship between the author's qualifications and the purpose of an operational audit. Standards developed by the General Accounting Office for an operational audit are examined as a basis for comparison with current audit programs in Coast Guard Non-appropriated Fund Activities (NAFA). The need for an operational auditing program in Coast Guard NAFA is established based on the level of operations of large Coast Guard NAFAs. A model for an operational audit program in Coast Guard NAFA is developed along with proposed guidelines and considerations. Considerations in implementing the proposed operational audit program are discussed as well as the author's recommendations for implementing an operational audit program in Coast Guard NAFA. The author concludes that there is a need for an operational audit program in Coast Guard NAFA and that implementation of the developed operational audit model would improve the current Coast Guard NAFA internal audit program. (Author)

AD-A093 582/5 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Evaluation of the United States Coast Guard's Enlisted Dining Facility Accounting and Reporting System.
Master's thesis,
Robert A. Jones. Sep 80, 118p

Proper management of Coast Guard Enlisted Dining Facilities is important to the operation of the Coast Guard Supply Fund and impacts upon the overall compensation of Coast Guard enlisted personnel. A comparison of the Coast Guard Enlisted Dining Facility accounting and reporting system with the General Accounting Office (GAO) objectives and model for Federal accounting and reporting systems is presented. In comparing the Coast Guard system to the GAO model, the author concludes that the Coast Guard system best achieves the objective of measuring fiscal compliance. The objectives of reporting the financial viability, assisting in resource allocations, and measuring program activity were only partially achieved. Consequently, assessment of the Coast Guard management's performance and stewardship using the Enlisted Dining Facility reporting system is limited. (Author)

AD-A093 584/1 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Evaluation of the Effect of Spares Allowance Policy upon Ship Availability and Reliability.
Master's thesis,
John Edward Leather. Sep 80, 116p

U.S. ships are provided onboard spare parts for equipment the ship's force is capable of repairing while at sea. The range and depth of spares provided has a pronounced effect on the availability of both ship and weapon systems. The spares suite for a particular ship is the Coordinated Shipboard Allowance List produced by the Ship's Parts Control Center. A mathematical model is used to produce this list, aiming to achieve stocking goals set by the Navy. This thesis examines the relationship between these goals and the model in use. A simulation model developed by the Naval Sea Systems Command has been modified so that it is compatible with the Naval Postgraduate School computer system, and this simulation model is used to evaluate the provisioning models. This simulation model is capable of being used for a variety of other projects at the Naval Postgraduate School. (Author)

AD-A093 599/9 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Algorithm for Scheduling a Ship's Force During a Shipyard Overhaul.
Master's thesis,
Osman Karadag. Sep 80, 95p

This thesis considers the combining of a ship overhaul project network with a shipyard project network to minimize possible scheduling conflicts during the ship overhaul process. The combined project is called the ship overhaul project network. A heuristic multi-pass scheduling algorithm is developed to combine the ship's and shipyard's project networks. The algorithm is tested with two sets of data. The work spaces on shipboard are considered as a common resource to both project networks, and the ship's complement is an uncommon but limited resource. Since the real-world problem is larger than the context of this thesis, some simplifying assumptions were made. The most important of these are the reliable communication link between ship and shipyard prior to and/or during the overhaul process, and sufficient knowledge about the shipyard project network as early as possible after overhaul initiation. (Author)

AD-A093 602/1 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Purchasing Productivity Measurement Systems.
Master's thesis,
Dennis Lloyd Wright, and Patrick William Cummings. Sep 80, 108p

The research focused on the measurement of productivity in purchasing organizations, in both the public and private sectors. The research was conducted by a review of the current literature, field research and survey of key purchasing personnel. The purpose of the research was to develop an effective method of measuring the productivity of a purchasing organization. The results of this research indicate that purchasing productivity measurement systems serve a variety of management needs: control of purchase organizations, projecting and distributing personnel resource needs, preparation of budgets and the improvement of productivity. The major contribution of the study is the identification of the essential parameters of an effective productivity measurement model. The model was then tailored to the needs of a public sector field purchasing activity. (Author)

AD-A093 604/7 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The Management Control of Aviation Fleet Maintenance Funds.
Master's thesis,
James Donald Reily, and Theodore J. Sheppard. Sep 80, 191p

This thesis contains the results of a management control system review of the United States Navy Aviation Fleet Maintenance (AFM) funds program. The research presents the AFM budget formulation and execution process and management control system procedures. Data was collected from the AFM funds administrators, obtained through telephone interviews and field visits, and compared with Type Commander directives; research on management control systems; and the AFM management control system of a Commercial Airline. The conclusions provide management with an evaluation of the strengths and weaknesses of the AFM management control system. Strengths include centralized budget formulation and standardized cost collection. Weaknesses include the lack of field activity involvement in the budget process, of measurement goals, of variance reviews, and of performance incentives. Recommendations are provided to assist management in improving AFM financial and management control. (Author)

AD-A093 627/8 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
How is the Federal Acquisition Regulation going to affect Future Acquisition Managers.
Master's thesis
Alfons Carl Marczynski. 1958, 72p

The objectives of this research are: (1) to review the initial development and drafting process of the Federal Acquisition Regulation (FAR), (2) to determine the extent of progress that has been achieved thus far, (3) to identify some of the handicaps now being encountered in the drafting of the FAR, (4) to evaluate and compare the FAR coverage in light of what it will supersede, and (5) to evaluate the impact of these elements on future acquisition managers. The result of this research indicates that the impact on acquisition managers in the way they conduct business will be minor to moderate at most. The FAR will not radically change the way procurement is being done, it will provide those involved with a better regulation with which to do their job. Those that are familiar with the current acquisition regulations will have no problems in transitioning to the FAR since the basic procedures and policies have not been changed, only improved and made more comprehendable. (Author)

AD-A093 689/8 Not available NTIS
Training Analysis and Evaluation Group (Navy), Orlando, FL.
Acquisition Cost Estimating Using Simulation.
Software,
William F. Parrish, Jr. 1978, mag tape, DOD/DF-81/002
Magnetic tape.
Availability: Source tape is in ASCII character set. Character set restricts preparation to 9-track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have any questions. $210.00. Price includes documentation, AD-A015 624.

No abstract available.

AD-A093 755/7 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
A Branch-Level Management Program for Assessing Branch Status on Projected Surplus/Deficit and Personnel Utilization.
Memorandum rept.,
C. L. Temes. 31 Dec 80, 16p Rept no. NRL-MR-4421

A time-share computer program is described, useful at the Branch level, for projecting surplus/deficit at the end of a current fiscal year and for monitoring the time assignments of Branch personnel. (Author)

AD-A093 863/9 PC **A04**/MF **A01**
Naval Material Command, Washington, DC.
Acquisition Management Contractor Cost Data Reporting (CCDR) System.
5 Nov 73, 66p NAVMAT-P-5241, AMCP-715-8, AFLC-P-800-15, AFSC-P-800-15

To maximize effective utilization of data sources, the Contractor Cost Data Reporting (CCDR) system has been developed to provide the primary data base for use in most cost estimating efforts, including procurement management activities involved with monitorship of contractor progress related to cost. The main thrust of CCDR is to assist all DOD Components in (1) preparing cost estimates for major system acquisitions reviewed by

the Defense Systems Acquisition Review Council (DSARC) at each program decision milestone, (2) developing independent Government cost estimated in support of cost and price analyses and contract negotiations, and (3) tracking contractor's negotiated cost. CCDR represents a significant improvement over previous cost reporting systems because will support all DOD functional elements involved in the acquisition process.

AD-A093 959/5 PC **A02**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Cost Plus Incentive Fee for Construction Contracts.
Final rept.,
Michael J. O'Connor, and Glenn E. Colwell. Dec 80, 24p Rept no. CERL-TR-P-118
Contract IAO-NEPO-79-1032

This study investigated various types of cost reimbursement contracts, with particular emphasis on the Cost Plus Incentive Fee (CPIF) contract. Pertinent regulations, guides, literature, and other data were studied and consolidated to form the basis for the guidance and recommendations offered. The various elements of the CPIF are defined and their interrelationships explained. Techniques for structuring CPIF contracts for maximum effectiveness are suggested. (Author)

AD-A093 977/7 PC **A02**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
Effect of Work Stability, Classification, and Sex on Organizational Effectiveness.
Technical rept.,
William H. Hendrix. Nov 80, 16p Rept no. AFIT-LS-5-80
Presented at the Annual American Psychological Convention (88th), Montreal, Canada, 1-5 Sep 80.

Research was conducted to establish the effects of work stability, personnel classification (i.e., airman, officer, or civilian), and sex on three criteria of effectiveness (i.e., satisfaction, climate, and perceived productivity). Data were collected on 4786 military and civilian personnel located at five Air Force bases using the Organizational Assessment Package (OAP). A 1-way ANOVA was used to test for differences between work-stability levels and a 2-way ANOVA to test for differences between subject's classification and sex. Work-stability levels differed significantly ($p < .001$) with more stable levels having higher values for all three criteria. Airmen scored lower on all three criteria while female civilians were lower on satisfaction and perceived productivity. (Author)

AD-A094 009/8 PC **A03**/MF **A01**
Air Force Engineering and Services Center, Tyndall AFB, FL. Engineering and Services Lab.
Engineering & Services Laboratory Fiscal Year 1982 Tecnical Objectives Documeent.
15 Dec 80, 27p Rept no. AFESC/ESL-TR-80-66

This TOD describes the three Technical Planning Objectives developed to guide the conduct of research and development in passive defense techniques for the theater airbase, pavement studies, environmental pollution abatement and control, air mobility concepts, fire fighting equipment, and resource/energy conservation. (Author)

AD-A094 024/7 PC **A03**/MF **A01**
Office of the Deputy Under Secretary of Defense for Research and Engineering (R/AT), Washington, DC.
Required In-House Capabilities for Department of Defense Research, Development, Test and Evaluation.
1 Oct 80, 26p

This report describes the required in-house RDT&E capabilities of the Department of Defense (DOD) RDT&E organizations. It discusses the role of Government R&D, the R&D process and environment, DOD responsibilities, and finally the required in-house capabilities. This document discusses the responsibilities of the DOD internal research, development, test and evaluation establishment, which comprises program management offices, laboratories, research and development centers, test and evaluation activities, and other technical organizations. Collectively, these internal RDT&E organizations represent a vital component of the Defense research, development, and acquisition program. (Author)

NUREG-0704 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Budget.
Budget Estimates Fiscal Year 1982. Appropriation: Salaries and Expenses.
Rept. for 1 Oct 81-30 Sep 82.
Jan 81, 75p
See also report for 1977, PB-249 327.

This report contains the fiscal year budget justification to Congress. The budget estimates for salaries and expenses for fiscal year 1982 provide for obligations of $500,700,000 to be funded in total by a new appropriation.

N81-15890/9 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Planning and Control of NASA Programs and Resources.
Jan 81, 54p NASA-TM-83090

The major management systems to form the agency's general management approach in carrying out its mission are described. Lists of documents containing more detailed descriptions of the processes and techniques involved in the agency's major management systems are presented.

PB81-134736 PC **A03**/MF **A01**
Battelle Southern Operations, Atlanta, GA.
Replication and Evaluation of Selected Innovations Developed Within the Urban Technology System: Report I, Project History, Evaluation and Recommendations.
Final rept.,
J. Mercer. 1980, 41p NSF/RA-800260
Grant NSF-ISP77-13029
See also Report II, PB80-134744.
Also available in set of 3 reports PC E08, PB81-134728.

The project provided for the transfer of technologies developed and proven within the Urban Technology System (UTS) to local governments outside the system. Innovations made available for this project were selected, evaluated, and screened from a group of approximately 130 UTS Briefs which described individual innovations. The innovations were then considered by the representatives of the six participating jurisdictions in a group meeting. The list of innovations was ranked using a technique called Interpretive Structural Modeling. The representatives then selected innovations and established pairings subject to the requirements that (1) two replication sites were to be required for each of three innovations, and (2) the two replication sites for any single innovation had to be in different geographical regions, namely the Southeast, Southwest, and Midwest. This replication effort has a very significant implication for local jurisdictions in general by demonstrating the usability of innovations which may otherwise have been seen as site specific.

PB81-134744 PC **A03**/MF **A01**
Battelle Southern Operations, Atlanta, GA.
Replication and Evaluation of Selected Innovations Developed Within the Urban Technology System: Report II, Case Studies.
Final rept.,
J. Mercer. 1980, 32p NSF/RA-800261
Grant NSF-ISP77-13029
See also Report I, PB81-134736 and Report III, PB81-134751.
Also available in set of 3 reports PC E08, PB81-134728.

The following case studies are presented: project Control System of Lincoln, Nebraska and East Point, Georgia; solar hot water heating to Middletown, Ohio and Austin, Texas; and telephone cost control to Denton, Texas and Chesterfield County, Virginia.

PB81-134751 PC **A05**/MF **A01**
Battelle Southern Operations, Atlanta, GA.
Replication and Evaluation of Selected Innovations Developed Within the Urban Technology System: Report III, Technology Replication Packages.
Final rept.,
J. Mercer. Mar 80, 84p NSF/RA-800262
Grant NSF-ISP77-13029
See also Report II, PB81-134744.
Also available in set of 3 reports PC E08, PB81-134728.

Three replication projects developed by the Urban Technology System (UTS) are reported: telephone cost control innovations for implementation; solar hot water heating; and project control systems. Overall objectives of these projects are the evaluation and replication of selected innovations in local government service delivery and a determination of critical factors which enhance or impede the replication process. The telephone project involved reviewing a jurisdiction's current or existing telephone system. This information was used to consider options and factors inherent in making major changes to that telephone system. The solar heating package is structured to provide guidelines for implementing solar hot water heating in public housing based on detailed technical information obtained from experience in a four-unit building in St. Petersburg, Florida. The project control system replication package discusses schedules, reports, and monitoring systems involved in project control and suggested procedures for implementing a project control system.

PB81-135170 PC **A05**/MF **A01**
Public Technology, Inc., Washington, DC.
Evaluation of Western European Technologies in the Fields of Energy and Management Improvement.
Final rept.
May 80, 81p NSF/RA-800268
Grant NSF-ISP77-15089

A tour by U.S. local government officials to identify transferable technologies is reported. Various technologies were observed in England, France, and Germany by eleven officials representing a cross-section of innovative city and county governments from diverse areas and varying size populations. The following technologies were examined in England: public lighting; nomograms; police management training simulation software; a highway maintenance data system; fuel conservation; energy sources; traffic controls and management; low energy housing; the PRESTEL television data system; performance review methods; and a waste separation plant. Technologies observed in France included geothermal district heating; cogeneration of electricity and heating; and microprocessors for vehicle tune-up and peak load control. Some systems observed in Germany included a thermobile, used to make retrofit decisions for buildings to meet Federal heat loss standards; a Federal energy policy review; new building standards; a modernization program; geoprocessing; a color printer; energy and traffic analyses; digitizing technology; and solid waste conversion. Multinational observations involved escalator activators, remote mini-garden plots, and highway sound barriers.

PB81-144859 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Program Analysis Div.
The Interaction of Federal and State Aid in New York State: Trends and Patterns, 1969-75.
Report to the Congress.
16 Dec 80, 47p PAD-81-10

While some Federal aid goes directly to local governments, large amounts pass through or are administered by the States. A better understanding of the States' role in aid distribution will help the Congress to assess the effectiveness of current and future Federal intergovernmental aid programs. GAO selected New York State for a series of in-depth case studies to highlight the similarities and differences in Federal and State policies. In examining the trends and patterns of Federal and State aid to local governments in New York from 1969-75, GAO found that these distribution patterns differ considerably.

PB81-146672 CP **T02**
Office of Management and Budget, Washington, DC. Federal Program Information Branch.

Catalog of Federal Domestic Assistance, 1980 (Second Update).
Data file,
Robert Brown, and James Adams. Dec 80, mag tape OMB/DF-81/001
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB81-146680.

The file reflects all the textual material published in the program description section of the Catalog of Federal Domestic Assistance (1980). There are 1,176 programs. In addition, a characteristics record is included for each program. These contain information extracted and coded from the textual material, for use with the accompanying documentation.

PB81-146847 PC **A03**/MF **A01**
Kentucky Univ., Lexington.
Science, Engineering, Technology and Kentucky's Government.
Final rept.,
Phillip W. Roeder, and John N. Maiorino. 1980, 40p NSF/RA-800160
Grant NSF-ISP78-05130

Ways are identified whereby the Kentucky executive branch can improve its capacity for using scientific and technological (S & T) resources in its policy formation and program management processes. Such resources can provide valuable assistance for coordinating programs with science and technology components, especially those involving more than one line agency, and can improve the state's S & T infrastructure. S & T mechanisms used in other states were reviewed and assessed to determine applicability to Kentucky. Lessons learned from Spindletop Research, and independent, nonprofit corporation which undertook applied research to stimulate Kentucky's economic and industrial development are described. Recommendations for a Kentucky S & T mechanism include: (1) creating an Office of Technology and Policy Management within the Governor's office; (2) strengthening ties of the university system and state government to deal more effectively with S & T issues, and (3) strengthening ties with and use of the private sector to deal with state S & T issues.

PB81-146854 PC **A05**/MF **A01**
Maryland Dept. of State Planning, Baltimore. Comprehensive Policy Planning Div.
State Science, Engineering, and Technology Program for the Maryland Executive Branch, Final Report,
John Sherwood, Marie Halka, John Garber, and Thomas Roguski. Feb 80, 80p DSP/PUB-80-8, NSF/RA-800265
Grant NSF-ISP78-14171

The study evaluates ways in which the Maryland Executive Branch currently acquires and uses scientific and technological (S/T) information in its policymaking activities, and identifies ways in which that S/T capability could be improved. The program was conceived in two parts. The first part was the identification of existing institutional mechanisms for incorporating S/T information in the executive decisionmaking and policy formulation processes. Recommendations for improving S/T capability in the Executive Branch are based on an analysis of the limitations of these mechanisms. The second part of the project consisted of an examination of the role of the Executive Branch in relation to technology assessment (TA), including an analysis of current state involvement in TA, opportunities that exist for the expansion or improvement of Maryland's TA activities, and the results of a case study that was undertaken to assess the applicability and transferability of S/T resources to selected issues of immediate concern to the state.

PB81-147613 PC **A03**/MF **A01**
National Science Foundation, Washington, DC. Div. of Intergovernmental Science and Public Technology.
Industrial Program, Grants and Awards 1973-1979.
1980, 48p NSF/RA-800338

Abstracts for grants and awards provided for the period 1973-1979 under the aegis of the Industrial Program of the National Science Foundation are compiled in this report. The Industrial Program fosters inquiry and experimentation into those processes and environments whereby through innovation, entrepreneurship, incentives the fruits of American science can more effectively strenghen American industry. Abstracts are grouped into three major categories: (1) university-industry centers experiments including cooperative research and innovation, (2) small business innovative research experiments, and (3) technology innovation projects. A fourth category encompasses studies, analyses and evaluations that identified needs, investigated alternatives, evaluated results, and, in general, provided the setting in which to launch major experiments. Within these categories each abstract includes the title, principal investigator(s), performing organization, grant code identification, date, amount, and duration. Indexes are provided for conferences, principal investigators, and institutions.

PB81-148462 PC **A08**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
An Evaluation of the Dichotomies within Federal Cash Management of Grant Programs,
Arthur L. Prahinski. Sep 80, 164p 36-77-III
Sponsored in part by Department of Health and Human Services, Washington, DC.

The Department of Health and Human Services operates a system designed to reduce the administrative burden on recipients and still provide adequate accounting controls. The system is known as the Departmental Federal Assistance Financing System or DFAFS. DFAFS goal is to reduce the administrative burden on recipients, and insure that recipients have funds available when needed. Also, DFAFS acts to reduce excess cash balances. The paper recommends that DFAFS serve as a nucleous or model for a Government wide grant disbursing system.

PB81-148504 PC **A08**/MF **A01**
Maryland State Dept. of Legislative Reference, Annapolis. Scientific Div.
Science, Engineering and Technology Services to the Maryland General Assembly (SSET).
Final rept.,
Myron H. Miller. Jun 80, 161p NSF/RA-800269
Grant NSF-ISP77-25883

The report presents the history, function, accomplishments, and effectiveness of Maryland's Science Division of the Department of Legislative Reference since its establishment in 1977. The office was set up to provide specific factual input for legislative decisionmaking. Included are a list of functions performed, comments, and percent of total effort in the following areas: liaison, administration, committee staffing, and representation of the General Assembly. Various methods of transferring information to the General Assembly are described. Also discussed are the legislative attitudes toward the new office. A final report by the Special Legislative University Council is included in the appendices.

PB81-149056 PC **A04**/MF **A01**
National Research Council, Washington, DC.
Review of Tax Processing System Planning for the Internal Revenue Service.
Final rept. Jul 79-Oct 80.
Oct 80, 65p
Contract TIR-79-35

A review of the planning of the Internal Revenue Service to replace the computing equipment now in use with emphasis on: (1) Security and privacy issues; (2) The management of the transition from the old equipment to the new equipment; and, (3) The conversion of computer programs from assembly language to a higher level language.

PB81-149064 PC **A07**/MF **A01**
Puerto Rico Legislative Assembly, San Juan.
Counterbalance: An Analysis of Scientific and Technical Information Requirements to Support the Legislative Task in Puerto Rico, Project Report, Volume 1.
Final rept.,
Sila S. Vazquez, Juan R. Melecio, and Chandler Harrison Stevens. Dec 79, 145p NSF/RA-790494
Grant NSF-ISP78-13309

Project Counterbalance was created to investigate the scientific and technical (S & T) information needs of the Legislature of Puerto Rico, to find out where this information is needed, and how it can be made readily available to the public. This report is based on S & T data collected from committee reports, surveys, and interviews. It consists of a summary, conclusions, and recommendations including a complete plan of action. These findings were made: The Legislature of Puerto Rico needs more S & T information; Areas of need are energy, natural resources, socio-economics, environmental quality, health, and education; New procedures must be devised for finding and handling S & T information. It is recommended that this work can be carried out simultaneously in three phases: (1) establishment of an inquiry-response service, cooperation with the University of Puerto Rico, development of a directory of local S & T sources of expertise, an intern program, and training of personnel; (2) long range studies by staff members and expanding access to local and national data banks; and (3) establishment of a joint committee of S & T in the Legislature and a center of S & T resources where information can be shared between the legislative and the scientific community.

PB81-150344 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. International Div.
Examination of Fiscal Year 1979 Financial Statements of the Panama Canal Organization and Treaty-Related Issues.
Report to the Congress.
12 Jan 81, 73p ID-81-14

The report is on the GAO examination of the Panama Canal organization's financial statements for fiscal year 1979, the last year before the Panama Canal Treaty of 1977 entered into force, and on Treaty-related issues. Chapter 3 of the report discusses the issue of Treaty-related costs and savings and our recommendation for coordination by the agencies to define, identify, and account for such costs and savings. The report also highlights in chapter 4 the impact of Treaty legislation on the Panama Canal Commission's budgeting and accounting system.

PB81-151425 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. Office of International Relations.
Standardization and Measurement Services in the Sudan.
Final rept.,
H. Steffen Peiser, Benjamin M. Gutterman, Gain L. Louis, Joan M. Pring, and John K. Taylor. Aug 80, 90p NBSIR-80-2020
Grant PASA-TA(CE)-5-71

A ten-member international team advisory to the Government of the Sudan's Ministry for Industry on Sudanese standardization and measurement services was organized by the U.S. National Bureau of Standards. The team split up into smaller specialist groups to survey the application of standardization and measurement technology to the following sectors: food industries, weights and measures (in retail markets), chemical industries standards and quality control, and textile (cotton). Detailed notes on the visit to 48 Sudanese organizations in industry and Government are reported.

PB81-152100 PC **A07**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Computer Science and Technology: Guidance on Requirements Analysis for Office Automation Systems.
Final rept.
Dec 80, 128p NBS/SP-500-72
Contract NB80-SBCA-0351
Library of Congress catalog card no. 80-600179.

This guideline presents a methodology for determining the feasibility and practicality of introducing (or expanding) office automation systems within the Federal Government. It is applicable to all office automation technologies such as word processors, dictation equipment, and telecommunications and is designed for use by agency officials and other employees who have the responsibility

for productivity improvement, procedural analysis data processing, or office systems.

PB81-152860 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Needs and Opportunities in Metrology of the Instituto de Pesquisas Tecnologicas for Effective Support of Brazilian Industry.
Final rept.,
Robert D. Huntoon. Feb 80, 37p NBSIR-80-1972
Sponsored in part by Instituto de Pesquisas Tecnologicas, Sao Paulo (Brazil), and Agency for International Development, Washington, DC.

A four-week joint study of measurement services of IPT served as a basis for examining the dislocations in the Sao Paulo measurement infrastructure. By comparing the activities in IPT, with its extensive knowledge of Brazilian technologies, was able to identify dislocations peculiar to Brazil and plan for itself appropriate corrective actions. The nature of the comparison and the corrective actions planned are presented in the report.

PB81-153934 PC **A04**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Brief Technology Assessment of the Domestic Steel Industry,
Bruce S. Old, Frederic A. L. Holloway, and Michael Tenenbaum. Jan 81, 67p EDA-81-010
Grant EDA-99-26-09886-10

The objectives of the study are to evaluate present technology in the steel industry and to determine in which phases of iron and steel manufacturing there exist for new technologies. This assignment is part of a larger study whose overall purpose is to identify means for reducing the unfavorable United States balance of trade in steel.

PB81-154288 PC **A02**/MF **A01**
Office of Management and Budget, Washington, DC.
Total Government Finances.
Jan 81, 10p

Tables are designed to provide two broad sets of information: (1) The size and major components of total government receipts, spending, and surpluses or deficits in the United States for each Federal fiscal year from 1947 through 1980; and (2) the size of government receipts, expenditures, and surpluses or deficits relative to the total economy for the same year. (For this latter purpose, the fiscal year gross national product (GNP) was used as the measure of the size of the total economy.) These data on total government finances combine data on State and local government finances with Federal budget data.

PB81-154510 PC **A04**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
A Study and Evaluation of Restructuring of Farmers Home Administration's Field Offices with Primary Emphasis on Coordination between the District Offices and Substate Planning Districts.
Final rept.,
Diggs O. Hill. 20 Aug 80, 66p 979-79-VI
Sponsored in part by Farmers Home Administration, Washington, DC.

The paper deals with a study and evaluation of FmHA's restructuring of its field offices. Major emphasis is placed on coordination of the district offices of the FmHa and substate planning districts in this study. The data and information from this paper will be an instrument by which the upper levels of FmHA can observe the strengths and weaknesses of restructuring. Recommendations are provided to help management in developing additional goals, changes and overall improvements in restructuring.

PB81-155509 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
Continuing and Widespread Weaknesses in Internal Controls Result in Losses Through Fraud, Waste, and Abuse.
Report to the Congress.
28 Aug 80, 48p FGMSD-80-65

In the past several years much publicity has been given to cases where Federal money was lost through fraud, waste, and abuse. The report discusses financial and accounting control weaknesses allowing these conditions to exist and demonstrates that these conditions could exist in most Federal agencies. The report points out that Federal agencies are required to maintain internal control systems that safeguard their financial resources. However, no mechanism now exists to enforce this requirement.

PB81-155962 PC **A04**/MF **A01**
Executive Office of the President, Washington, DC. Information Systems Development Div.
Budget Data and Title Files (FY 81),
Michael V. Kenlon. 23 Jan 81, 53p OMB/DF-81/002A
For system on magnetic tape, see PB81-155954. Supersedes Rept. no. OMB/DF-80/002A, PB80-158421.

The FY81 Budget and Budget Title data file contains three files. (1) The Master Account Title (MAT) file contains the authorized identification codes for all appropriation accounts appearing in the budget; the authorized chapter/agency, organization/bureau, and appropriation account titles to be used in the budget; a complete cross-reference of all OMB appropriation accounts to the Treasury identification codes; and sequencing and identification codes for computer-generated reports. The file controls the entry of data into the Appropriation Account Data (AAD) computer file. (2) The Receipt Account Title (RAT) file contains titles and codes related to the receipt accounts in the Budget (see OMB Circular A-11, Section 22.3 for a discussion of Budget Accounts). (3) The Budget Preparation System Master (BPS) File contains approximately 48,000 records and consists of the following record types: Program & Finance Schedule Data (P&F); Supplementary Source Document 'A' Data (SSD-A); Supplementary Source Document 'B' Data (SSD-B); Supplementary Source Document 'C' Data (SSD-C); Object-Classification Data; Federal Credit Data; and Receipt Data. The information contained in these records provides the financial input to the production of the tables and analyses appearing in 'The Budget of the United States'.

PB81-160061 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
Electronic Funds Transfer--Its Potential for Improving Cash Management in Government.
Report to the Congress.
19 Sep 80, 40p FGMSD-80-80

The report discusses how the use of electronic funds transfer technology in Government can help reduce interest costs and improve the forecasting of cash flows. Because private industry is using this technology to improve its cash management, GAO made this review to determine whether the Government's expanding use of this technology is effectively improving cash management in Government.

PB81-169278 PC **A05**/MF **A01**
Urban Inst., Washington, DC.
Integrated Analysis of Administration of Housing Allowance Programs,
James P. Zais, and John Trutko. Sep 76, 91p HUD-0001274
Contract HUD-H-2162R

A broad conceptual framework is provided for the study of administrative issues in the three components of the Experimental Housing Allowance Program (EHAP). The study provides a basis for future integrative work on administrative issues and assists in making decisions on what work can be done to meet the short - term reporting needs of HUD. The paper assumes that administration of a program does make a difference in determining program outcomes. Outcomes are believed to be affected by variation in at least three separate dimensions of administration: (1) variation in the way individual administrative functions are performed, (2) variation in the intergovernmental relationships established for the program, and (3) variation in the degree of administrative integration with other programs. A review of program analysis to date in each of these areas is presented. Directions for future research are outlined, and implications resulting from the developed framework are discussed. The most important implications are the need for combining analyses done at the individual experiment level with some primary analysis of data across experiments, the recognition that some analyses will be far less rigorous than others, the importance of focusing on a broad class of programs rather than on only those tested at program sites, and the necessity for merging research on administration with findings on program outcomes. (Author abstract modified).

PB81-169294 PC **A05**/MF **A01**
Massachusetts General Court, Boston. Special Commission on the Effects of State Mandated Programs.
Local Mandated Program Inventory Manual.
Feb 80, 96p HUD-0001388
Sponsored in part by Advisory Committee on Intergovernmental Relations, Washington, DC., and National Conference of State Legislatures, Washington, DC.

The process and outcome of creating an inventory of State - mandated programs which impact local governments in Massachusetts are discussed. In 1977, the Massachusetts legislature established a special commission for the purpose of reviewing the impact of State - mandated programs on local governments, particularly regarding local taxation. Throughout its study, the commission was unable to obtain from departments or agencies in Federal and State governments an inventory of mandates affecting local governments. In January 1979, the commission applied for and received a technical assistance grant from the National Conference of State Legislatures for the purpose of developing such an inventory. The objectives of the pilot project were to develop a manual detailing the methods for compiling and updating computerized inventories of mandates; to develop a catalog of all legislative, administrative, and judicial mandates which impose costs on local governments in the selected fields of education, public health, and public works; and to develop a computer data base from the catalog with the capability of expansion to all mandating fields. The research found 380 statutory mandates, 47 State court - ordered mandates, 76 State administrative rules and regulatory mandates, 144 Federal legislative mandates, 58 Federal court - ordered mandates, and 365 Federal rule and regulatory mandates. The information collected for the project is preliminary and exploratory. Additional research is necessary to ensure that all mandates have been found in the selected areas and to expand the data base to all mandating fields. The mandates found are described in the appendix. (Author abstract modified).

PB81-169716 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Allowance Program Administration: Interim Findings. Housing Assistance Supply Experiment,
G. T. Kingsley. Dec 79, 85p RAND/N-1277-HUD, HUD-0001694
Contract HUD-H-1789

Interim findings are reported through September 1977 about the administration of the housing allowance programs being operated as part of the Housing Assistance Supply Experiment (HASE). The experiment was designed to test market and community effects of a full scale allowance program in two contrasting housing markets: Brown County, Wis. (Metropolitan Green Bay), where a small minority population exists; and St. Joseph County, Ind. (Metropolitan South Bend), where blacks account for a significant percentage of the population. By September 1977, 3,100 households were receiving monthly allowance checks at the first site and by the same date, 4,900 households were receiving payments at the second site. The program is administered at each site by a separate nonprofit corporation, a Housing Allowance Office (HAO), established to conform to experimental requirements. Funding for each program is for 10 years. The HAO's interview applicants to determine their eligibility, inspect housing, and distribute monthly benefit payments. The report discusses administrative costs, client intake, outreach, the enrollment process, enrollment error control, housing certification, enrollee services, and directions for future research. Tables, footnotes, and an appendix containing organization charts for the HAO's are provided. (Author abstract modified).

PB81-169781 PC **A15**/MF **A01**
National Opinion Research Center, Chicago, IL.
Distribution of Grants to Local Government: Equalization in the American Polity,
Peggy L. Cuciti. Dec 79, 336p HUD-0001708
Grant HUD-H-5088RG

Michigan's intergovernmental grant programs were analyzed to determine if their distribution favored local governments with low fiscal capacities and / or high service needs. Michigan's 85 cities which had populations larger than 10,000 in 1970 were selected for study. Measures of fiscal capacity and need were constructed, and patterns of fiscal disadvantage were analyzed. Fiscal capacity and public service need measures were based on the actual revenue and expenditure practices of local governments. The flows of Federal and State grants in 1967, 1972, and 1977 were analyzed to determine if they helped equalize the ability of the 85 study cities to provide services. Grants were considered equalizing if they enabled local governments making the same tax effort either to spend equal amounts per capita or to spend unequally if required by differences in service needs. Evaluating the pattern of grants distribution entailed contrasting actual dollar flows with model distributions designed to equalize the ability of local governments to provide services. The State's revenue sharing program does not aid low - wealth jurisdictions per se, but it does direct assistance to those with high service needs relative to capacity. It makes the local government system more equitable as defined by the standard of equal results, but not by the standard of equal expenditures. None of the Federal grant programs analyzed produced distributions favorable to cities with relatively low fiscal capacities. Most of the programs studied, however, gave some recognition to differences in service needs in the distribution of funds. Suggestions for future work in this area are offered. Data sources, methodological detail on the measurement of service need, and a listing of selected data items are appended. A selected bibliography (about 170 references) is provided, along with tabular and graphic data.

PB81-803108 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Design to Cost and Life Cycle Costing. December, 1978-November, 1979 (Citations from the NTIS Data Base).
Rept. for Dec 78-Nov 79.
Feb 81, 225p
See also 1964-October, 1975, NTIS/PS-76/1035, November, 1975-November, 1976, NTIS/PS-77/1144, December, 1976-November, 1977, NTIS/PS-78/1249, and December, 1977-November, 1978, PB80-802564.

Management control methods for cost effectiveness of systems and systems design are investigated in these research reports. Federal, municipal, and industrial applications of the developed philosophies are reported. (This updated bibliography contains 215 citations, none of which are new entries to the previous edition.)

PB81-803116 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Design to Cost and Life Cycle Costing. December, 1979-1980 (Citations from the NTIS Data Base).
Rept. for Dec 79-1980.
Jan 81, 360p
Supersedes PB80-802572, and NTIS/PS-78/1250. See also 1964-October, 1975, NTIS/PS-76/1035, November, 1975-November, 1976, NTIS/PS-77/1144, December, 1976-November, 1977, NTIS/PS-78/1249, and December, 1977-November, 1978, PB80-802564.

Management control methods for cost effectiveness of systems and systems design are investigated in these research reports. Federal, municipal, and industrial applications of the developed philosophies are reported. (This updated bibliography contains 252 citations, all of which are new entries to the previous edition.)

PB81-803124 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Research Management. 1978-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1978-Jan 81.
Jan 81, 218p
Supersedes PB80-803638, and NTIS/PS-78/1309. See also 1971-1977, NTIS/PS-78/1308.

Theory and practice of the management of research are described in the reports cited, including modeling techniques, such as practical applications in financing, personnel, and program allocation and critiques of existing practices. Reports covering primarily innovation, assessment, and annual reports of individual organizations are excluded. (This updated bibliography contains 210 citations, 80 of which are new entries to the previous edition.)

PB81-852436 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Analysis and Management Perspectives of Industrial Processes Operations. October, 1974-June, 1980 (Citations from the Management Contents Data Base).
Rept. for Oct 74-Jun 80.
Jul 80, 140p

The citations in this bibliography cover strategic perspectives for make or buy decisions, future trends in automation, perspectives in materials management, forms design, plant controllership, new product development, and auditing work processing operations. (Contains 200 citations, fully indexed and including a table of contents.)

5B. Documentation and Information Technology

AD-A093 533/8 PC **A02**/MF **A01**
Hawaii Univ., Honolulu. Dept. of Electrical Engineering.
Addressing and Directory Systems for Large Computer Mail Systems,
Jose J. Garcia-Luna, and Franklin F. Kuo. Oct 80, 21p Rept no. CCIS-4
Contract N00014-78-C-0498

In this paper, we present a general description of the addressing schemes necessary to provide efficient identification and delivery services in large computer mail systems. The structure of the required directory system is described in detail under the assumption of the existence of a communication protocol utilized to communicate the delivery processes. For the purposes of completeness, the basic structure of an architecture for large computer mail systems is introduced at the beginning of this work.

AD-A093 534/6 PC **A04**/MF **A01**
Army Aviation Research and Development Command, St Louis, MO.
Information Resource Management an Introduction for Managers.
Final rept.,
Shirley J. Smith. Aug 80, 75p Rept no. USAAVRADCOM-TR-81-F-1

Information Resource Management (IRM) is bringing changes -- perhaps even forcing changes -- within large organizations, whether business, industry, or government. The phrase and the concept reflect the growing awareness that information is a resource of an organization -- just as are its personnel, finances, inventory, and physical plant. It is in fact, a resource which is essential to the decision-making process. An important component of this new era of information management is the evolving technology of computer software and hardware dedicated to database management. Sophisticated software packages (Data Base Management Systems) have been available for several years. Their best use requires a high level of analytical expertise of a kind which is not often found within the typical data processing department. This report serves as an introduction to IRM for managers. It presents the results of a long research study of the published literature which describes the experiences and recommendations of managers, database systems analysts, consultants, ad academicians.

AD-A093 538/7 PC **A05**/MF **A01**
Washington Headquarters Services (DOD), DC. Directorate for Information Operations and Reports.
Map Book. Major Military Installations and Industrial Facilities Owned or Leased by Army, Navy, and Air Force.
30 Nov 80, 77p

This MAP BOOK contains the major installations and activities of the Military Departments within the United States including Alaska and Hawaii. This includes both command installations and industrial installations owned or leased by the Army, Navy and Air Force. Government-owned industrial installations operated by contractors are included; however, installations with mixed facilities (part government, part contractor ownership) are not included. A supplemental list of the industrial installations for each Military Department is also included.

AD-A093 676/5 PC **A06**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
NUSC Technical Publication Guidelines.
Technical document.
8 Dec 80, 102p Rept no. NUSC-TD-5329B
Supersedes Rept. no. NUSC/NL-TD-5329, AD-A048 066 and Rept. no. NUSC/TD-5329A.

This Guide is intended as a basic reference for the preparation and processing of technical reports, documents, manuals, memoranda, and brochures/pamphlets at the Naval Underwater Systems Center. It has two main purposes: (1) to establish common standards of communicating technical information for engineers and scientists at the Center and (2) to promote a common understanding among author, editor, and reviewer of the requirements and responsibilities that each type of technical publication imposes. It also has another, less obvious, purpose: to encourage the participants to respect each other's perogatives and to convince them of the importance of working as a team. In addition to discussing the preparation and processing of technical publications, the Guide offers numerous techniques and devices to aid the author. Revision B of this document includes guidelines for phototypeset publications (Appendix D) and OCR scanner copy preparation (Appendix E). In addition, the text has been reformated (phototypeset) and revised to reflect changes attributable to Executive Order 12065 (Security Markings) and Center reorganization. (Author)

AD-A093 753/2 PC **A02**/MF **A01**
RAND Corp., Santa Monica, CA.
Writers, Editors, and Computer,
Constance U. Greaser. Jul 80, 13p Rept no. RAND/P-6520
Presented at the Annual Meeting of the Society for Scholarly Publishing (2nd), Minneapolis, MN, 1-3 Jun 80.

It's easy to dream about how marvelous the future will be for publishers, writers, and editors; it's usually quite a different matter to make those dreams come true. Occasionally others will say to me, 'It must be paradise working in a research environment with in-house computer experts who can solve your problems.' Actually, I have the same difficulty the rest of you do. My frustration level may be even higher, because I am indeed surrounded by brilliant computer scientists, but solving publication production problems just isn't very high on their priority list. Along with everyone else, I'm faced with meeting daily deadlines with resources that are completely operational today; there is usually quite a gap between reality and our dreams. I've spent some time recently trying to get information on the way computers and new technologies are affecting the writing and editing processes. There are data available on newspaper reporters who use terminals instead of typewriters, and there are, of course, plenty of statistics on how computers have aided the composition process. But I couldn't find anything about the ways in which book and journal authors and editors are using computers to make their lives easier. Thus, this presentation reflects only my own experiences at The Rand Corporation in Santa Monica, California. Some of you may be doing things in a far more sophisticated manner than we are, but for those of you who are not yet staring at screens instead of typewriters, this discussion may provide an over-

view of both the problems and the promise of computerized publishing. (Author)

AD-A094 000/7 PC **A20**/MF **A01**
Defense Technical Information Center, Alexandria, VA.
Source Header List. Volume I. A through L.
Rept. for period ending 17 Dec 80,
James P. Burrell. Jan 81, 467p Rept no. DTIC/TR-81/2
Supersedes Rept. nos. DDC/TR-77/2, AD-A041 700 and DTIC/TR-80/5, AD-A087 000. See also Volume 2, AD-A094 001.

This publication is a two volume, alphabetically arranged, compilation of source names used by the Defense Technical Information Center (DTIC). Each source name is assigned a 6-digit numeric code for computer input and retrieval purposes, plus a 4-digit alphanumeric geopolitical code and an alphanumeric type code. Source names displayed are included as data elements in the Technical Report, Work Unit Information System, Research and Development Program Planning, and Independent Research and Development data bases maintained by DTIC. These volumes replace the DDC Source Header List, dated June 1978 (AD-A041 700) and Supplement 3, dated June 1980 (AD-A087 000). (Author)

AD-A094 001/5 PC **A20**/MF **A01**
Defense Technical Information Center, Alexandria, VA.
Source Header List. Volume II. M through Z.
Rept. for period ending 17 Dec 80,
Jan 81, 475p Rept no. DTIC/TR-81/3
Supersedes Rept. nos. DDC/TR-77/2, AD-A041 700 and DTIC/TR-80/5, AD-A087 000. See also Volume 1, AD-A094 000.

This publication is a two volume, alphabetically arranged, compilation of source names used by the Defense Technical Information Center (DTIC). Each source name is assigned a 6-digit numeric code for computer input and retrieval purposes, plus a 4-digit alphanumeric geopolitical code and an alphnumeric type code. Source names displayed are included as data elements in the Technical Report, Work Unit Information System, Research and Development Program Planning, and Independent Research and Development data bases maintained by DTIC. These volumes replace the DDC Source Header List, dated June 1978 (AD-A041 700) and Supplement 3, dated June 1980 (AD-A087 000). (Author)

HEDL-SA-2271 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
WUIS: Water Use Information System.
J. C. Sonnichsen, and J. F. Fletcher. 1980, 9p
CONF-801167-1
Contract AC14-76FF02170
NAWDEX membership conference and workshop, Falls Church, VA, USA, 18 Nov 1980.

The Water Use Information System (WUIS) contains data on water use requirements for thermal electric power plants and on water resources. The system provides a means whereby data can be retrieved in an expedient and orderly manner for purposes of performing environmental assessments and reviewing the potential impacts associated with proposed energy resources development on water resources. Retrieval and use of the data contained within WUIS provides data allowing planners to make initial assessments on water usage considerations. The water resource data available for retrieval are organized and stored for each of the 1875 Water Resource Cataloging Units (WRCA) defined by the United States Geological Survey. Data may be aggregated to form data bases for larger areas such as Hydrologic Accounting Units and Hydrologic Subregions. Each Cataloging Unit represents all or a portion of a natural hydrologic drainage basin. Data are included for the forty-eight contiguous states. The Water Use Information System was placed into operation in the spring of 1978. The system is available for use by both public and private organizations. Fees for retrieval of data are on a cost-recovery basis according to established Department of Energy policies. (ERA citation 06:006034)

N81-15893/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Interfaces Between Statistical Analysis Packages and the ESRI Geographic Information System.
E. Masuoka. Oct 80, 26p NASA-TM-82031
Submitted for Publication.

Interfaces between ESRI's geographic information system (GIS) data files and real valued data files written to facilitate statistical analysis and display of spatially referenced multivariable data are described. An example of data analysis which utilized the GIS and the statistical analysis system is presented to illustrate the utility of combining the analytic capability of a statistical package with the data management and display features of the GIS.

N81-15894/1 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
The Role of Scientific Engineers in the Realization of Information Systems at the National Aerospace Laboratory (Nlr).
W. Loeve, and H. A. T. Timmers. Dec 79, 25p
NLR-MP-78038-U
In Dutch: English Summary. Presented at Tech. Univ., Twente, Netherlands, 22 Nov. 1978.

Applied informatics combines knowledge from several scientific disciplines. It was shown how at the NLR, informatic systems were developed by multi-disciplinary project groups. Some points for discussion are given with respect to the skills which must be met by scientific engineers who form part of such a project group. The general discussion is illustrated by the description of an actual application.

N81-15895/8 PC **A10**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France).
A Basis for the Elaboration of an Automated Library for the Visually Handicapped Through Automatic Translation of Existing Printed Files Bases pour l'Elaboration d'Une Bibliotheque Informatisef pour les Defichients Visuels Par Traduction Automatique de Fichiers Deja Costitues dans l'Imprimerie Classique.
Ph.D. Thesis - Lille Univ.
J. C. Meneau. Feb 80, 209p ENST-E-80002
Text in French.

World wide production of braille literature was reviewed along with the printing technologies for braille print. Techniques for the fabrication of braille books are described. The principles of automatic translation of printed literature into braille print are presented. The development of public knowledge of the problems that face the visually impaired in the telecommunication field is stressed along with the development of increased access by the handicapped to the telecommunication community. A general description of the information library is presented, with emphasis on the software utilized in the system.

N81-15937/8 PC **A14**/MF **A01**
Osaka Univ. (Japan). Faculty of Engineering.
Technology Reports of the Osaka University, Volume 30, Numbers 1517-1550.
Mar 80, 316p ISSN-0030-6177

No abstract available.

PB80-916199 Subscription
National Technical Information Service, Springfield, VA.
NTIS Title Index (Cumulative, 1979-1980) and NTIS Title Index (Retrospective, 1964-1978).
1981, 2 issues
Microfiche (48X) available on subscription, North American Continent price $675.00; all others write for quote.

The NTIS TITLE INDEX Retrospective Index covers all reports incorporated into the NTIS Data Base from Mid-1964 through and including 1978. Indexes are on 48X microfiche in three sections: (1) Key Word Out of Context (KWOC); (2) Accession/Report Number Index; (3) Personal Author Index. The retrospective Index is available with the Current Index as a complete package.

PB81-140527 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY.
Data Needs for Evaluating the OSHA Safety Program.
Final rept. Jun-Dec 80,
Robert S. Smith. Dec 80, 29p ASPER/PUR-80/2130/A

The report argues that the best way to evaluate OSHA's safety program is either to compare the experience of early and late inspectees in a given year, or to compare the experience of inspected and uninspected plants who are on OSHA's yearly target list. It is also suggested that both strategies should employ autoregressive procedures to control for non-OSHA influences on injury rates. Based on use of the above evaluation methodologies, the following recommendations concerning data needs should be adopted: OSHA's Management Information System (MIS) files should include the employer's ID code used in BLS injury reports, data on injury rates and employment prior to inspection, and consultation data. BLS should collect quarterly injury rates and the percentage of a plant's workforce that is inexperienced. OSHA should issue its inspection target list on a calendar year basis and require its inspectors to audit plants' injury records. Further, steps should be taken to ensure the accuracy of SIC Codes at the four-digit level in the MIS files.

PB81-148751 PC **A16**/MF **A01**
Department of the Interior, Washington, DC. Office of Library and Information Services.
Information Sources and Services Directory.
1979, 370p
Errata sheet inserted. Sponsored in part by Geological Survey, Reston, VA. Resource and Land Investigations Program.

The directory provides access to the sources of information within the Department of the Interior by subject, Bureau, and geographic location.

PB81-150971 PC **A06**/MF **A01**
Pakistan Scientific and Technological Information Centre, Karachi.
Index to Theses and Dissertations - Science (Sind Province, Pakistan) 1970-1974,
Shamin Farrukh, and Akhtar Iqbal. 28 Feb 79, 121p
Portions of this document are not fully legible.

The index contains the post-graduate theses and doctoral dissertations of Sind Province, Pakistan, written between 1970 and 1974. The index is divided into sections on the Agricultural College, Tandojam; Agricultural Research Institute, Tandojam; Atomic Energy Research Centre, Tandojam; Jinnah Post Graduate Medical Centre, Karachi (subdivided by departments of anatomy, biochemistry, medicine, microbiology, pathology, pharmacology, physiology, and surgery); N.E.D. Engineering College, Karachi (civil and mechanical engineering); National College of Engineering and Technology, Karachi (chemical and electronic engineering and metallurgy); University of Karachi (Departments of Biochemistry, Botany, Chemistry, Genetics, Geology, Mathematics, Microbiology, Pharmaceutical Chemistry, Pharmaceutics, Pharmacognosy, Pharmacology, Physics, Physiology, Statistics, Zoology, Institutes of Chemistry, and Marine Biology); University of Sind (Departments of Botany, Fresh Water Biology and Fisheries, Geology, Zoology, Institute of Chemistry).

PB81-151862 PC **A03**/MF **A01**
HUD USER, Germantown, MD.
Fiscal Impact Analysis for State and Local Government.
Sep 80, 35p HUD-0001833, HUD/PDR-639
Contract HUD-H-2644

The bibliography of 34 citations introduces the topic of fiscal impact analysis and its powerful role in local land use decisions. Drawn from the HUD USER data base, the bibliography makes available to local government officials, administrators, planners, and analysts a group of reports on how to calculate and apply information necessary to estimate the financial costs and revenues associated with growth and development issues. The bibliography also contains instructional and other research material to assist a State or local jurisdiction in conducting a fiscal impact study. Analytical

approaches include use of manual systems as well as computer models. One study examines the fiscal concerns and other issues facing cities, metropolitan areas, and regions with substantial net outmigration. In addition, for the first time in this State and local government series, practitioner-produced studies have been included to provide examples of real-world applications of fiscal research. Among these studies are cost-revenue analyses of proposed annexations, redevelopments, capital improvement programs and public investment policies. The annotations are arranged alphabetically by title and date from 1972 through 1979. Lists of personal authors corporate authors are supplied. Ordering information is given but no pricing information is provided.

PB81-153314 PC **A05**/MF **A01**
American Inst. of Physics, New York.
Database Searching and Document Delivery via Communications Satellite.
Final rept. 1 Oct 72-31 Mar 80,
Rita G. Lerner, Colin K. Mick, and Daniel Callahan. Jun 80, 84p AIP-80-1
Grant NSF-DSI77-18052
Prepared in cooperation with Applied Communication Research Inc., Stanford, CA.

Librarians, scientists and engineers at several laboratories associated with NASA used an online information system, DIALOG, to search SPIN, a computerized database of abstracts of physics and astronomy articles; requested articles were delivered by facsimile transmitter. A database of abstracts of articles accepted for publication but not yet in print was also available. Searches and document delivery used either the experimental Communications Technology Satellite (CTS) or telephone lines; an ATS satellite was occasionally used for document delivery. The report also examines the human factors involved in the acceptance of a new information delivery system; the way in which the service was presented at each site had a significant impact on utilization and adoption by library patrons.

PB81-153520 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
The Executive's Guide to Data Resource Management.
Dec 80, 40p

Data Resource Management concerns knowledge and management of data and of its composition, sources, dissemination, flow, locations, and uses. It is a management program, supported by a Data Resource Directory system, which applies to the management of data the basic principles of resource management. This document publishes one of the three final reports of Federal Information Processing Standards Task Group 17. This report is an executive guide to Data Resource Management.

PB81-153538 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Guidelines for Implementing Data Resource Management.
Dec 80, 109p

Data Resource Management concerns knowledge and management of data and of its composition, sources, dissemination, flow, locations, and uses. It is a management program, supported by a Data Resource Directory system, which applies to the management of data the basic principles of resource management. This document publishes one of the three final reports of Federal Information Processing Standards Task Group 17. This report provides guidelines on the characteristics, tools, and implementation of a Data Resource Management program.

PB81-153983 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. International Economics Div.
Large Data Sets: Processing Guidelines for Economists.
Staff rept.,
Kevin J. Lanagan. Sep 80, 34p AGESCS-800910

The paper lists guidelines for analysts working with large data sets intended for computer storage and manipulation. Particularly when processing very large data sets, organization and planning of data collection, data preparation, and loading are extremely important. Considerable loss of time and money may result from oversights such as inconsistency in naming conventions or variable scales. Even a handful of aberrant record formats in a data set of 2000 variables could later require extra time for set merging. Careful preparation helps avoid such errors and inconvenience.

PB81-154205 PC **A10**/MF **A01**
Department of Commerce, Washington, DC.
U.S. Ocean Policy in the 1970s: Status and Issues. Appendix A-Legislative Authorities for Federal Ocean Activities - Preliminary.
Oct 78, 223p NOAA-80123110
See also report dated Oct 78, PB-292 155.

This appendix to U.S. Ocean Policy in the 1970s: Status and Issues, is a compilation of the legislative framework for the marine programs in the Federal Government. It includes legislation approved December 1977. Legislative and other administrative authorities for major ocean programs of Federal agencies and departments are cited and summarized.

PB81-158487 PC **A10**/MF **A01**
Public Technology, Inc., Washington, DC.
UTS (Urban Technology System) Briefs, 1-195 (Includes Index).
Jul 80, 213p NSF/RA-800287/1-195
Grant NSF-ISP77-26003

The directory of technical briefs is a compilation of short reports on technology at work in the cities and counties of the Urban Technology System (UTS). Technological developments throughout the latter half of the 1970s are summarized and represent a broad cross section of the United States. Each brief consists of statements of the problem, solution, results, and other considerations, as well as persons to contact. Subject areas include the following: community and economic development; criminal justice; energy; environmental services; fire safety and disaster preparedness; health; human services; management, finance, and personnel; public works and public utilities; and transportation.

PB81-158941 PC **A04**/MF **A01**
Office of Management and Budget, Washington, DC.
Federal Information Collection: Agency Actions on Commission on Federal Paperwork Recommendations. Volume I. Multi-agency Recommendations.
Dec 80, 71p

Congress created the Commission on Federal Paperwork to study the Federal Government's burgeoning information gathering activities and to recommend changes in the Government policies and practices that impact on the paperwork burden. The legislation that established the Commission also required OMB to monitor and report on executive branch agency responses to the Commission's recommendations. This publication and others that will follow in this series are in response to that requirement.

PB81-159469 PC**$8.00**/MF**$3.00**
National Library of Medicine, Bethesda, MD.
List of Serials and Monographs Indexed for Online Users, 1981.
cJan 81, 119p NLM-MED-81-01
Supersedes PB80-131204. Also pub. as ISSN-0196-755X.

The List of Serials and Monographs Indexed for Online Users is designed to provide complete bibliographic information on serials and congress proceedings cited in three MEDLARS files: MEDLINE, Health Planning & Administration (abbreviated HEALTH), and POPLINE. The serials listed also include the majority of titles in the MEDLINE backfiles.

PB81-802084 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Library Management. 1978-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1978-Jan 81.
Jan 81, 138p
Supersedes PB80-802887, and NTIS/PS-78/1317. See also 1964-1977, PB80-802879.

The cited references include reports on management of library operations and personnel. Specific topics covered are management of acquisition and processing of library holdings, management planning of programs and activities, operations analysis, economic analysis, community library services and needs, planning of libraries in various regions, library personnel management, and training. (This updated bibliography contains 131 citations, 52 of which are new entries to the previous edition.)

5C. Economics

AD-A093 556/9 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Analysis of the Corporate Merger between the Babcock & Wilcox Co. and J. Ray Mcdermott & Co., Inc.
Master's thesis,
Robert Stephen Russell. Sep 80, 159p

This thesis analyzes the merger, consummated on March 31, 1978, followed a lengthy bidding war between McDermott and United Technologies Corporation. The energy crisis, its impact on the future world economy, and its relationship to the businesses of the Babcock & Wilcox and McDermott are studied. A financial analysis of B&W and McDermott is then conducted to determine their financial positions and potential growth. The terms of the merger, along with its legality are further described and analyzed. A post merger appraisal was undertaken, including such aspects as Three Mile Island and McDermott's 'price-fixing' scandal. The conclusion was that the merger was successful for McDermott for various reasons; but from B&W's viewpoint, the jury is still out.

AD-A093 619/5 PC **A05**/MF **A01**
Department of State, Washington, DC. Office of External Research.
Special Interests and Transnational Relations in Agricultural Trade: Implications for United States-Mexico Relations,
David R. Mares. 1980, 82p FAR-3011
Prepared in cooperation with Harvard Univ., Cambridge, MA. Center for International Affairs.

Trade issues rank among the most important topics in international relations. Two characteristics of the international system provide the basis for the increased bargaining power of small states: the internationalization of production and the strategic value of the smaller states to the major power. This paper examines the process by which Mexican tomato producers and their government utilized both bargaining chips to successfully resist U.S. restriction on tomato imports in 1969 and again in 1979. (Author)

AD-A093 621/1 PC **A05**/MF **A01**
Department of State, Washington, DC. Office of External Research.
Petroleum and Political Change in Mexico,
Edward J. Williams. 1980, 85p FAR-3010
Prepared in cooperation with Arizona Univ., Tucson.

This paper describes and analyzes those conditions of and forces for change. After a brief description of production and export policy and practice and the growth of Petroleos Mexicanos, the effort looks to contributions to institutional change and to policy controversy directly tied to the petroleum industry. The discussion then evolves to other foci of policy disputation indirectly related to the new milieu created by anticipated petroleum earnings. Finally, in a more speculative vein, the paper gauges the significance of the new oil for political change by examining the profundity of the issues at controversy, the scope and intensity of the challenges to governmental authority, and the sectors and individuals involved in the several disputes and departures. (Author)

AD-A093 685/6 PC **A02**/MF **A01**
Department of State, Washington, DC. Office of External Research.

Arab Investment in Africa and the Trilateral Venture,
Jeswald W. Salacuse. 1980, 13p FAR-30014
Prepared in cooperation with Southern Methodist Univ.

'Arab investment,' for purposes of this paper, refers primarily to non-concessional resource flows for productive purposes emanating from Arab states or institutions they control. For all practical purposes, such states consist of four Arab oil producers -- Saudi Arabia, Kuwait, the United Arab Emirates, and Qatar -- whose limited absorptive capacities enable them to accumulate substantial capital surpluses. While they have provided the African continent with relatively significant amounts of aid and other forms of concessional flows, their investments thus far have been much less important. Consequently, much of what follows in this paper is based on fragmentary evidence drawn from a very few African countries, and particularly the Sudan. (Author)

AD-A093 698/9 PC **A02**/MF **A01**
Department of State, Washington, DC. Office of External Research.
Transnational Influences on Commonwealth Caribbean Mass Communications,
John A. Lent. 1978, 15p FAR-28312
Prepared in cooperation with Temple Univ., Philadelphia. Presented at the Transnational Forces in the Caribbean Panel, 19th Annual Meeting, International Studies Association, Washington, DC, 25 Feb 78.

Good news and bad news have characterized the indigenization attempts of Commonwealth Caribbean mass communications during the past decade. The good news is that local ownership is replacing that of foreign entrepreneurs in most mass media operations. The bad news is that all too often, one of the few local agencies capable of affording mass media is the government. The good news is that there are increasing efforts at local production and exchange of news and media content. The bad news is that some of these attempts have been sabotaged by petty jealousies of island nations, more attractive media packages at lower costs offered from the outside or technical problems. This paper first looks at media ownership trends of Commonwealth Caribbean mass media, followed by recent changes in news flow and media content. (Author)

AD-A093 752/4 PC **A02**/MF **A01**
RAND Corp., Santa Monica, CA.
The Benefits to the Netherlands of Certain Internal Investment Subsidies in Light of Common Market Policies,
Velma Montoya Thompson. Sep 80, 17p Rept no. RAND/P-6478-1

As Dutch policymakers consider alternative agricultural investment strategies, they confront special economic incentives to the Netherlands arising from membership in the European Economic Community, popularly known as the Common Market. In particular, membership subjects the Netherlands to the Common Market's agricultural price controls and its program for agricultural modernization. This paper asks: Is it in the interest of the Netherlands people for their government to subsidize farmers' investments in more mechanized equipment. The answer presented here takes specific account of the Community's two principal agricultural policies. This paper has two main parts. First, we consider the EEC agricultural pricing policies. Within this context, we determine whether the Dutch Government should induce Dutch agricultural producers to invest in more mechanized equipment. Our finding here is that the Dutch people as a group cannot be expected to gain from more than the amount of investment freely chosen by Dutch producers. Second, we describe the EEC subsidy program for agricultural modernization, and determine the conditions under which the Netherlands gains by accepting the EEC investment subsidy to farmers. Under this additional complication, we find that Dutch policymakers should accept the subsidy for Dutch agricultural products with highly elastic export demands; otherwise, they should reject the subsidy. (Author)

AD-A093 785/4 PC **A02**/MF **A01**
California Univ., Berkeley. Operations Research Center.
A Functional Inequality, with Applications to Production Theory.
Research rept.,
King-Tim Mak. Oct 80, 18p Rept no. ORC-80-22
Contract N00014-76-C-0134, Grant NSF-MCS77-16054

A functional inequality is used in the formulation of a regularity condition on the scaling of production. This functional inequality is characterized and then applied to: deduce a law of diminishing return; and derive a bound on the growth of an open economy. (Author)

PB81-146714 PC **A11**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
Supporting Innovation: A Policy Study.
Final rept.,
Christopher T. Hill, and Richard A. Andrews. Sep 80, 226p EPA-560/12-80-002
Contract EPA-68-01-5878
Portions of this document are not fully legible.

After several years of debate the Toxic Substances Control Act (TSCA) was enacted into law in 1976. The purpose of the present project is to design, analyze, and assess alternative policies that might be used to address the problems TSCA might create for innovation, while maintaining the dominant thrust of TSCA to protect health and the environment from unreasonable risk of injury and disease. The ongoing policy discussions and the literature on technological innovation yield many suggestions of such policy options, and a major concern of this research has been to assess and analyze the potential of those options to contribute to the solution of the problem at hand in a cost-effective and responsible manner.

PB81-148512 PC **A14**/MF **A01**
Boston Coll. Chestnut Hill, MA. Social Welfare Research Inst.
Earnings and Labor Supply: A Microeconomic Comparison of American Indians and Alaskan Natives to American Whites and Blacks.
Final rept. 1 Mar 79-30 Dec 80,
Ronald L. Trosper. 15 Dec 80, 307p PUB-55, DLETA-91-95-79-11-1
Grant DL-91-95-79-11

Determinants of American Indian and Alaskan Native earnings, labor force participation, and labor supply are analyzed using data from the Survey of Income and Education. Estimated equations for American Indians are compared to those of Whites and Blacks. Earnings equations are used to compute imputed wages for use in estimating labor supply equations. Labor supply is measured by labor force participation and by annual weeks of participation in 1975. A chapter comparing Alaskan Natives to Whites in Alaskan has inconclusive results. An Appendix presents national population and income estimates for American Indians and Alaskan Natives and compares them to American Blacks and Whites. Comparisons are cross-classified by age, education, labor force participation, occupation and industry.

PB81-148678 PC **A04**/MF **A01**
Arizona Univ., Tucson. Dept. of Economics.
Effects of Minimum Wage Policy on Inflation and on Output Prices, Employment, and Real Wage Rates by Industry.
Preliminary rept.,
James C. Cox, and Ronald L. Oaxaca. Dec 80, 64p
Sponsored in part by Minimum Wage Study Commission, Washington, DC.

Basically, the results reported in this preliminary paper pertain to the effects of freezing minimum wage rates at their 1974 values over the period 1975-78. Two additional simulations that the authors attempted examine the effects of indexing the minimum wage.

PB81-150070 PC **A02**/MF **A01**
Bureau of Mines, Washington, DC.
Mineral Depletion Allowances and U.S. Import Dependence.
Information circular/1980,
Phillip N. Yasnowsky, and Annette P. Graham. 1980, 19p BUMINES-IC-8824

The report examines the percentage depletion allowance rate structure in relation to several criteria that are indicative of U.S. mineral import dependence. These criteria are the minerals considered as strategic and critical for stockpiling purposes, the ratio of reserves to forecasting cumulative demand (1976-2000) for selected minerals, and the U.S. net import reliance as a percentage of apparent consumption (1978), also for selected minerals. In addition, a basic discussion of the mineral depletion allowance is provided, including numerical examples illustrating the computation of the allowance under several assumptions. Also, the percentage depletion allowance rates for individual minerals are tabulated.

PB81-150294 PC **A07**/MF **A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Systems-Integration Requirements for the Synergistic Co-Siting of Industrial Activities.
Final rept.,
J. M. Spurlock, H. C. Ward, J. T. Sommerfeld, and D. K. Sondhi. Jul 80, 128p NSF/RA-800347
Grant NSF-DAR76-80993

An interdisciplinary study of synergistic co-siting is reported. Synergistic co-siting is the mutually beneficial location and coupling of industrial activities, including agricultural operations. The basis of the program, consisting of a logical sequence of tasks, is systems integration.

PB81-151516 PC **A06**/MF **A01**
Idaho State Univ., Pocatello. Public Policy Research Center.
Economic Impacts in Idaho of Changing Federal Land Management Policies.
Final rept. 1 Jan 79-29 Feb 80,
Donald C. Reading, Gary R. Wells, Race D. Davies, Ronald B. Timpson, and Michael L. Matukonis. 1980, 107p PNRC-916-04
Contract PNRC-10990016

It is the purpose of this document to project economic impacts on Idaho of recent changes in federal land management policies. A brief history of the federal policies for planning and management of western lands is provided, and the major material, development, uses, and limitations of the study's Input/Output (I/O) model for assessing economic impacts of relevant actions and activities are discussed. Finally, results of the I/O analyses are reported, and a few conclusions and recommendations are offered.

PB81-151839 PC **A10**/MF **A01**
John F. Kennedy School of Government, Cambridge, MA.
Intrajurisdictional Property-Tax Capitalization.
Final rept.,
Howard S. Bloom, Helen F. Ladd, and John Yinger. Aug 80, 222p HUD-0001811
Grant HUD-H-2915RG

The paper measures the extent to which property taxes may be reflected in house values, a phenomenon known as property-tax capitalization. Property taxes are said to be capitalized into house values if, all else being equal, a higher property-tax payment leads to lower house values. The report measures capitalization by examining the relationship between tax changes and value changes. Focusing on intrajurisdictional tax capitalization, the report notes that recent reevaluation in Massachusetts communities has led to changes in assessed values and, hence, to changes in tax payment. On the basis of double-sales data (data for houses that sold twice) the paper investigates the extent to which changes in tax payments generated by reevaluation are reflected in house values. The analysis applies to the change in tax payment relative to other houses in the jurisdiction, not to total change in tax payment. Many studies have attempted to estimate the degree of property-tax capitalization. These studies are reviewed to evaluate what has been learned about tax capitalization and to focus on the methodological obstacles confronting previous research. Tables, footnotes, and approximately 50 references are provided. Appendices contain data sources, price indices, preferred capitalization equations, case studies, and related material.

PB81-152159 PC **A05**/MF **A01**
Minimum Wage Study Commission, Washington, DC.
Discontinuous Distributions and Missing Persons: The Minimum Wage and Unemployed Youth.
Preliminary draft rept.,
Robert H. Meyer, and David A. Wise. Jan 81, 87p

It is clear from the graphs in the report that the minimum wage has a rather dramatic effect on the distribution of wage rates. The first three graphs show the distribution of wage rates for out-of-school youth aged 16 to 17, 18 to 19, and 20 to 24 respectively. The last two present distributions of wage rates among little educated youth in low wage areas versus more highly educated youth in high wage areas. A large proportion of the 16 to 17 age group is paid at the minimum, while a substantial proportion are paid below the minimum as well. Very few of the 20-24 age group are paid below the minimum.

PB81-152183 PC **A05**/MF **A01**
ACT Systems, Inc., Winter Park, FL.
Development and Application of a Water Supply Cost Analysis System. Volume I.
Final rept. Sep 78-Sep 79,
James I. Gillean, William L. Britton, Jr., John H. Brim, and Robert M. Clark. Jul 80, 81p EPA-600/2-80-012A
Contract EPA-68-03-2506
See also Volume 2, PB81-117954.

The Environmental Protection Agency is concerned with the Safe Drinking Water Act's economic impact on the water supply industry. Experience has shown that although most utilities maintain an accounting system, the data provided by the system are maintained in different formats and are therefore incompatible among utilities. To help remedy this deficiency, the Drinking Water Research Division has initiated a program to develop standardized techniques for analyzing data within a utility accounting framework. Volume I describes the development and application of this system to Kenton County, Kentucky Water District No. 1.

PB81-153637 PC **A03**/MF **A01**
Minimum Wage Study Commission, Washington, DC.
The Federal Minimum Wage, Employment, and Inflation.
Preliminary draft rept.,
Herschel I. Grossman, and John Boschen. Dec 80, 31p

The study investigates the effects of federal minimum wage policy on minimum wage employment, aggregate employment, and average wage rates. The theoretical analysis focuses on the possible effect of the federal minimum wage in constraining wages and employment in a subset of labor markets, on the possible responses of labor suppliers to these constraints, and on the possible role of the policy of presetting the nominal minimum wage in making monetary policy nonneutral. An essential element in the analysis is the assumption that the expectations of workers and employers are rational.

PB81-154031 PC **A04**/MF **A01**
National Opinion Research Center, New York.
Structural Models of Minimum Wage Effects: Analysis of Wage and Coverage Policies,
John M. Abowd, and Mark R. Killingsworth. Dec 80, 73p
Contract DL-J-9-M-0-0070
Prepared in cooperation with Rutgers - The State Univ., New Brunswick, NJ.

The authors present a series of analytical and empirical studies of the impact of minimum wage legislation on employment and wage rates. They begin by developing 'simple' minimum wage models, ones that seem to be a natural extension and elaboration of the conventional models that have appeared in the literature on the effects of minimum wage laws. For the limited purpose of deriving analytical results, such simple models seem reasonably satisfactory, and careful analysis of such models helps correct and quality various incorrect or misleading claims about the impact of minimum wage laws.

PB81-154908 PC **A04**/MF **A01**
New York Univ., NY. Dept. of Economics.
A Simulation Model of the Effects of an Increase in the Minimum Wage on Employment, Output, and the Price Level.
Preliminary draft rept.,
Edward N. Wolff, and M. Ishaq Nadiri. Dec 80, 64p
Sponsored in part by Minimum Wage Study Commission, Washington, DC.Portions of this document are not fully legible.

A number of theoretical and empirical models have been formulated to trace the effects of changes in minimum wage legislation on the level of employment, wage rate, and prices. A partial list of these studies and their major findings are reported in table 1. They concentrate on teenage employment which is likely to be affected most by changes in the minimum wage legislation and on estimating the direct impact of minimum wages on the aggregate or particular classes of workers.

PB81-156556 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Economic Analysis of Alternative Milk Concentration Methods.
Staff rept.,
Ed Jesse. Dec 80, 31p AGESS-801201

Rapidly increasing energy costs dictate a reappraisal of present methods of transporting fluid milk between surplus and deficit regions. Methods which permit transportation of a concentrated product which can be reconstituted to a whole fluid product near the point of consumption have the potential for reducing energy use and consumer prices. Processing, transportation, and reconstitution costs for five alternative concentration options are estimated and compared with the present method of whole fluid distribution to evaluate economic benefits at varying distances from assembly points to bottlers.

PB81-160079 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
The United States Exerts Limited Influence on the International Crude Oil Spot Market.
Report to the Congress.
21 Aug 80, 43p EMD-80-98

The report describes the international crude oil spot market, its role in the larger crude oil market, its importance relative to total U.S. imports of crude oil, and how U.S. Government actions and programs affect it. GAO made this review because of the importance of the spot market during 1979 and because the Government, other Nations, and oil company officials have expressed concern about its growing size and effects on crude oil prices.

PB81-160103 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
The Foreign Tax Credit and U.S. Energy Policy.
Report to the Congress.
10 Sep 80, 70p EMD-80-86

The report discusses the impact of the foreign tax credit provisions of the Internal Revenue Code on the U.S. oil industry and the implications for U.S. energy policy. The report also discusses the potential effects on oil industry operations and on energy policy of proposed changes to the current law.

PB81-169302 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Transfer Income Model (TRIM) Projection Capability: A Report on the Validation of the Housing Allowance Data Base,
Ronald J. Sepanik. Mar 77, 37p HUD-0001400
Contract HUD-H-2162R

The Urban Institute's Transfer Income Model (TRIM) operates on a large, nationally representative microdata base used in various contexts to analyze alternative income - conditioned transfer plans. This validation report focuses on one of the existing TRIM capabilities -- its ability to represent different time periods, as applied to the Experimental Housing Allowance Program (EHAP). EHAP is a research project analyzing direct cash housing assistance to lower - income clients. The TRIM aging procedures involve updating the basic microdata, representative of 1969 incomes and 1970 demographic information, and synchronizing it with experimental data representative of more recent years. The validation of these aging procedures consists of two phases; this report constitutes an interim stage between them. It reports on the validity of earlier TRIM estimates of cost coverage and benefit patterns for various designs of a housing allowance program, appraises current procedures and identifies areas that need improvement, and provides information on the desirability of using a new data base in the second phase of the Integrated Analysis work on alternative housing allowance programs. Section 2 of this report compares a recently aged census public use sample data base with published estimates from the current population survey. Compared in Section 3 are factors used in aging the data base in phase one to data from the annual housing survey. The discussion in Section 2 focuses on the validity of the procedures, highlights areas requiring additional work, and provides information for deciding whether or not to continue using an aged data base. Section 3, on the other hand, focuses on the accuracy of the forecasts used in the first phase of the TRIM rather than on procedures validity. The projected growth rates of the earlier TRIM work for house value and gross rent are compared to the actual growth rates revealed by the annual housing survey, thus serving to validate previously provided estimates of cost, coverage, and benefit patterns. The final section discusses the weaknesses in the procedures and indicates how they could be overcome by the introduction of the 1976 survey of income and education, which is in a time frame closer to that of the experimental findings; thus, less chronological synchronization would be necessary between the data base and the behavioral information. Tabular data are included. Tables and footnotes are provided.

PB81-169393 PC **A05**/MF **A01**
Copley International Corp., La Jolla, CA.
Study to Identify the Existence of any Housing Credit Market Differentials Between Rural and Other Areas and to Identify Causes of Such Differentials. Volume 2. Harrisburg, Pennsylvania Case Study,
Caryl S. Foster. Dec 78, 95p HUD-0001535
Contract HUD-H-2338R

This study had two objectives: (1) to determine whether a real differential does exist in the housing and mortgage market between rural and urban areas of Harrisburg, Pa., and (2) if such a problem does exist, to identify the causes of the differential. The study was part of a greater effort to examine these issues for four sites, including Harrisburg, Pa.; Mobile, Ala.; San Diego, Calif.; and Springfield, Ill. Initial portions present general information on the City of Harrisburg and the matched rural area. Included are descriptions of Harrisburg's geographical setting and history, identification of economic activities, and a socioeconomic profile of the population, as well as information on income and employment and housing patterns. Another section presents major findings of the survey of consuming units. The consuming units are analyzed in terms of socioeconomic characteristics, income, employment patterns, and housing characteristics, as well as financial methods respondents used in purchasing their homes. Overall, the study found that although urban and rural areas exhibit many similarities, major differences exist between them. For one, the percentage of blacks residing in the rural areas is 2 percent, compared with the percentage of blacks residing in the urban areas -- 31 percent. Differences also existed in educational attainment, employment patterns, type of dwelling units, and wages for the two types of areas. In addition, responses to the homeowner survey showed that urban areas had a disproportionately small amount of blacks owning homes, compared to their representation in the area, while the proportion of blacks in rural areas nearly matched the proportion of black homeowners in the area. Commercial banks provided most of the mortgage credit to rural homeowners, while mortgage banks or realty companies provided credit to urban homeowners. Further conclusions are summarized in the final section. One map and 64 tables are included. (Author abstract modified).

PB81-169401 PC **A05**/MF **A01**
Copley International Corp., La Jolla, CA.
Study to Identify the Existence of Any Housing Credit Market Differentials Between Rural and Other Areas and to Identify Causes of Such Differentials. Volume 3. Mobile, Alabama Case Study,
Susan P. Scott. Dec 78, 100p HUD-0001536
Contract HUD-H-2338R

This study had two objectives: (1) to determine whether a real differential does exist in the housing and mortgage market between rural and urban areas of Mobile, Ala., and (2) if such a problem does exist, to identify the causes of the differential. The study was part of a greater effort to examine these issues in four sites, including Harrisburg, Pa.; Mobile, Ala.; San Diego, Calif.; and Springfield, Ill. Initial portions of this report present general information on the City of Mobile and the matched rural area. Included are descriptions of the geographical setting and history of Mobile, identification of economic activities, and a socioeconomic profile of Mobile's population, as well as information on income and employment and housing patterns. Another section presents major findings of the survey of consuming units. Consuming units are analyzed in terms of socioeconomic characteristics, income, employment patterns, and housing characteristics, as well as respondents' financial methods of purchasing their homes. Overall, the study found that the population of the Mobile area is predominantly white, with a sizable black minority in the urban areas. The median urban family income is approximately $2,000 higher than its rural counterpart. Similarities between the two areas were age, sex, and racial distribution of the population, as well as educational attainment and occupation. Major differences were in home prices, wages, and employment growth rates. Housing and mortgage credit market surveys conducted as part of the study found that, among other things, differences between the urban and rural areas were notable with regard to the median price of the house, the lot size, and the type of mortgage financing obtained. Other findings are summarized in the final report section. One map and 67 tables are included. (Author abstract modified).

PB81-169419 PC **A05**/MF **A01**
Copley International Corp., La Jolla, CA.
Study to Identify the Existence of Any Housing Credit Market Differentials Between Rural and Other Areas and to Identify Causes of Such Differentials. Volume 4. San Diego, California Case Study,
Susan Scott, and Caryl Foster. Dec 78, 90p HUD-0001537
Contract HUD-H-2338R

This fourth volume of an eight - volume series reports on a study of possible housing credit market differentials in the San Diego, Calif., area between rural and urban locales. The total area studied includes the City of San Diego and five rural communities in Imperial County. Two surveys provided data for an econometric analysis of housing and mortgage credit market between the urban and rural areas. They were conducted concurrently; one developed information on home purchasers in urban and rural areas, and the other gathered data from mortgage lenders in the same areas. Although many of the housing characteristics in urban and rural areas were similar, differences did appear. The mean urban purchase price was about $24,000 higher than the rural home purchase price; 44 percent of the urban sample exhibited purchase prices greater than or equal to $35,000, compared to only 7 percent for the rural sample. The urban households tended to obtain house financing from a savings and loan association, while the rural borrower most often used a commercial bank. Government - insured loans were used slightly more in urban areas than in rural. The survey of lending institutions in the San Diego study area was disappointing; the data gathering was limited by complexities attributable to branch banking and a recently publicized redlining study. Generalization of the conclusions is unwarranted because of data limitations. Tabular data are provided. (Author abstract modified).

PB81-169427 PC **A05**/MF **A01**
Copley International Corp., La Jolla, CA.
Study to Identify the Existence of Any Housing Credit Market Differentials Between Rural and Other Areas and to Identify Causes of Such Differentials. Volume 5. Springfield, Illinois Case Study,
Elizabeth L. Lakinger. Dec 78, 99p HUD-0001538
Contract HUD-H-2338R

This study had two objectives: (1) to determine whether a real differential does exist in the housing and mortgage market between rural and urban areas of Springfield, Ill., and (2) if such a problem does exist, to identify the causes of the differential. It was part of a greater effort to examine these issues for four sites, including Harrisburg, Pa.; Mobile, Ala.; San Diego, Calif.; and Springfield, Ill. Initial portions present general information on the City of Springfield and the matched rural area. Included are descriptions of the geographical setting and history of Springfield, identification of economic activities, and a socioeconomic profile of its population as well as information on income, and employment and housing patterns. Another section presents major findings of the survey of consuming units. Consuming units are analyzed in terms of socioeconomic characteristics, income, employment patterns, and housing characteristics, as well as respondents' financial methods of purchasing their homes. Furthermore, major findings of the survey lending institutions are discussed. Overall, the study found that the Springfield area, while predominantly white, has a major minority black population, mostly residing in urban areas. Median family incomes in urban and rural areas are not appreciably different (less than $1,000 difference), and incomes for both areas are less on the average than that for the State as a whole. Expansion of employment in the 1966 - 67 period was approximately 2.5 percent annually for both areas, while urban wages grew at 7.4 percent and rural wages at 8.3 percent. Major differences between the areas are centered around the fact that Springfield is the State capital. Additional data were gathered in homeowner and mortgage credit market surveys. These revealed that rural houses were significantly older than urban houses. They had greater square footage and were placed on significantly larger lots; however, they were about $9,000 dollars cheaper on the average than urban homes. Rural homeowners obtained financing for houses from commercial banks; urban homeowners, from savings and loan associations. Further findings are summarized in the report's final section. One map and 67 tables are included. (Author abstract modified).

PB81-169435 PC **A11**/MF **A01**
Econometric Research Associates, Inc., Del Mar, CA.
Study to Identify the Existence of Any Housing Credit Market Differentials Between Rural and Other Areas and to Identify Causes of Such Differentials. Volume 6. Statistical Analysis of Outstanding Mortgage Credit Differences Between Urban and Rural Areas.
Dec 78, 244p HUD-0001539

This research sought to identify the factors contributing to observed inequities in outstanding mortgage credit between urban and rural areas. Possibly contributing to this situation are these factors: (1) lenders offer less favorable mortgage terms in small areas due to an absence of competition; (2) persons in rural areas may prefer less housing and / or less mortgage debt; and (3) the rural population may be less mobile, thereby having paid off a larger percentage of the mortgage debt on the average. The analysis consists of three parts. The first part tests the hypothesis that rural households have fundamentally different preferences than urban households. Of particular concern are the savings versus expenditure decision, the housing versus nonhousing expenditure decision, and the allocation of housing expenditures among various components. To the extent possible, the analysis uses expenditure data and corresponding price and income data to determine whether rural households and urban households with similar household characteristics behave the same when facing similar environments and market conditions. The second part of the analysis addresses the issue of outstanding mortgage credit in urban and rural areas by assuming that the consumer (household), given whatever preferences exist, will take into account the characteristics of the household, local prices, etc., in deciding on the characteristics of the house to be purchased. The analyses involved in the step - by - step process of obtaining mortgage credit are detailed. The next part addresses the potential contribution of lender behavior to outstanding mortgage credit differences between rural and urban areas. Finally, the last part provides some conclusions and policy implications pertinent to the statistical analysis in the first three parts. The ultimate goal of the research is to provide a basis for policy decisions which might appropriately alleviate the problem of inequitable mortgage allocation between urban and rural areas. The study recommends that the reasons why Government - insured loans are much less prevalent in urban and rural areas should be identified, as well as why savings and loan associations are relatively inactive in rural areas. Also, it is suggested that longer term loans and lower down payment requirements need to be made more available in rural areas. Further research to aid in correcting the problem should include strengthening this study's shortcomings, especially the lender analysis; constructing a policy simulation model; and expanding this type of study to include renters and rejected loan applicants. Footnotes and tables are provided.

PB81-169443 PC **A15**/MF **A01**
Econometric Research Associates, Inc., Del Mar, CA.
Study to Identify the Existence of Any Housing Credit Market Differentials Between Rural and Other Areas and to Identify Causes of Such Differentials. Volume 7. Appendices to Statistical Analysis of Outstanding Mortgage Credit Differences Between Urban and Rural Areas.
Dec 78, 338p HUD-0001540

This volume contains technical information pertinent to the econometric analysis presented in its companion volume, Vol. 6 of the series, 'A Study To Identify the Existence of Any Housing Credit Differentials Between Rural and Other Areas . . .' This report focuses on housing and mortgage demand and supply models which are designed to identify the causes of observed housing and housing credit differentials between nonrural and rural areas. To provide a point of reference, an aggregate time series model of housing and mortgage markets which focuses on construction activity is described, in order to present the overall structure of housing and mortgage markets. Next, a cross section approach, more pertinent to studying regional differences in housing and mortgage markets, is introduced by modifying the aggregate time series model. However, such an approach is insufficient to identify the underlying causes of urban - rural differences. Therefore, the microeconomic foundations of such a model are explored, including individual (borrower and lender) behavior and interactions. One model depicts the behavior of individual lending offices; this model can be used to identify the cause of systematic differences in behavior of urban and rural lenders. Another model shows the behavior of households in order to address issues highlighted in background material provided by HUD, such as different prices and income patterns, different demographic characteristics, and different preferences. All suggested potential sources of urban and rural housing and mortgage demand differences have been incorporated in the models presented. Also, systematic urban - rural differences in permanent income, income variability, demographic characteristics, costs of living and housing costs, and the subsequent implications of such differences for housing credit allocation between rural and nonrural areas can be determined. The demand models are also structured in a way that makes simultaneous estimation of individual mortgage credit demand functions and mortgage credit supply functions possible. This approach facilitates the separation of demand phenomena and supply phenomena as potential causes of urban - rural differences in the composition and value of outstanding mortgage credit and housing. A final section of the appendix presents general statistics and covers the Copley Household Survey, the 1970 census of housing data, and the Annual Housing Survey. Numerous tables and figures, footnotes, and related references are provided. (Author abstract modified).

PB81-851537 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Systems Analysis Applied to Economic Forecasting. January, 1970-September, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Sep 80.
Oct 80, 104p

This retrospective bibliography contains citations concerning the applications of systems analysis and operations research to domestic and international economic forecasting. A wide variety of industries and resources are considered as are the effects of government activities and actions. (Contains 77 citations, fully indexed and including a table of contents.)

PB81-852212 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Industrial Financial Analysis and Investment Perspectives. December, 1978-June, 1980 (Citations from the Management Contents Data Base).
Rept. for Dec 78-Jun 80.
Jun 80, 147p

The citations in this bibliography cover product portfolio diagnosis, financial analysis of industry, financial planning and control in the 1980's, business decisions, and investment perspectives. Financial criteria and techniques for appraising individual and portfolios of investments are discussed. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-852295 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Domestic and International Economic Plans and Policies. May, 1978-June, 1980 (Citations from the Management Contents Data Base).
Rept. for May 78-Jun 80.
Jun 80, 149p

The citations in this bibliography cover different theories to resolve the economic problems pertaining to inflation, industrial development for economic growth, price stability, tax reductions and lower government spending. The relationship between political stability, inflation, agriculture problems, and economic policies of other countries are also discussed. (Contains 200 citations, fully indexed and including a table of contents.)

5D. History, Law, and Political Science

AD-A093 576/7 PC **A03**/MF **A01**
Sanders Associates, Inc., Nashua, NH. Destruct Techniques Group.
Unraveling the TRIAD: Arms Transfers, Indigenous Defense Production, and Dependency. Iran as an Example,
Stephanie G. Neuman. 1979, 35p FAR-3012
Prepared in cooperation with Columbia Univ., New York.

This paper analyzes the relationship between the military industrial capabilities of third world countries and their dependency on the states which supply them with arms. It focuses on the tension between the foreign policy goal of independence, which leads many governments to establish a domestic military industry, and the internal constraints which prevent them from achieving their goal. It discusses the kinds of tradeoffs third world defense planners must make between economic factors and perceived security needs. Two main hypotheses serve as the organizational framework for this paper: (1) Arms transfers to less industrialized countries (LICs) initiate an evolutionary progression toward the indigenous production of military technology. (2) Dependency for third world states is no less a product of indigenous defense production than of arms transfers.

AD-A093 577/5 PC **A11**/MF **A01**
Department of State, Washington, DC. Office of External Research.
The Observance of the Covenant on Civil and Political Rights by the Soviet Union,
Valery Chalidze. 1980, 242p FAR-3013
Prepared in cooperation with Institute on Socialist Law.

The fact that the Soviet state is under the total control of the Communist Party of the Soviet Union is widely known. Party control over the Soviet state has not received legal elaboration full enough to be considered a match to what is effectuated in practice. Throughout the entire history of the Soviet state, starting at any rate with the disbanding of the Constituent assembly in 1918, the party of the Bolsheviks, subsequently renamed the Communist party of the Soviet Union, has exercised total control over the activity of the state in Russia and then in the USSR. This fact has never been reflected in Soviet legislation fully: the maximum degree of its attestation was achieved in the USSR Constitution of 1977, which states (Art. 6): 'The leading and guiding force of Soviet society and the nucleus of its political system, of all state organizations and public organizations, is the Communist Party of the Soviet Union...' Even without mentioning the numerous, commonly known facts concerning party control over the state, those words of the Soviet Constitution indicate that, in analyzing practice relating to the effectuation of human rights in the Soviet Union, one must pay attention not only to the prescriptions of the law and accounts of legal practice, but also to party documents, including the Statute of the CPSU and the Program of the CPSU.

AD-A093 660/9 PC **A02**/MF **A01**
Department of State, Washington, DC. Office of External Research.
ECOWAS and Other West African Regional Organizations,
John P. Renninger. 9 Jun 80, 6p FAR-30015

I have been asked to discuss linkages between ECOWAS and other African regional organizations such as ECA, ADB, CEAO, and others. I do not intend to give 'equal time' to all of these organizations. Instead I will focus on West African organizations, some of which are economic and some of which are not. This in no way implies that relationships between ECOWAS and some of the continental organizations such as ECA and ADB are not important. ECA, for example, played a very important role in the creation of ECOWAS and continues to be a strong supporter of ECOWAS. The potential for a close and fruitful relationship also exists with ADB. I will not discuss these relationships precisely because they present no immediate problems and more interesting observations can be made about ECOWAS and other West African organizations. (Author)

AD-A093 684/9 MF **A01**
Department of State, Washington, DC. Office of External Research.
The Soviet Military and Arms Control,
Douglas F. Garthoff. Mar 77, 39p FAR-28322
Presented at the conference, The Soviet Military at Home and Abroad, 3-5 Mar 77, Warrenton, VA.
Availability: Microfiche copies only.

Any effort to examine the attitudes and role of the Soviet military in arms control matters would be remiss not to point out the impossibility for Western observers to reach clear-cut, let alone definitive conclusions. The available data is simply inadequate to that task in the face of continuing Soviet secrecy about the USSR's political process and defense matters. To cite with reference to SALT but one example of this difficulty involving both attitudes and role, we do not know whether the military had more influence on the Soviet acceptance of the 1972 interim agreement on offensive weapons, at a time when Grechko was not in the Politburo and no professional military figures apparently participated directly in the Moscow summit meetings, or on the Soviet acceptance of the 1974 guidelines of offensive weapons, when Grechko had been on the Politburo for a year and a half and senior military representatives did take part in the Vladivostok summit. It should also be noted at the outset that the military do not necessarily think and act as a unified interest group on arms control.

AD-A093 699/7 PC **A02**/MF **A01**
Department of State, Washington, DC. Office of External Research.
Georgians in Tsarist Russia and in the USSR,
Oleg Zinam. 1974, 23p FAR-20655
Prepared in cooperation with Cincinnati Univ., OH. Dept. of Economics. Presented at the International Conference of Slavists at Banff (Alberta), 4-7 Sep 74.

Should one deny the right to a national statehood to Georgians who 'formed and independent and highly civilized kingdom within the Greco-Roman world when the ancestors of the Russians were still nomads wandering about the draughty steppes'. Should such a nation, despite of her incessant struggle for the nationhood, be denied the right to independent national existence and be classified with 'those numerous small relics of peoples which, after having figured for a longer or shorter period on the stage of history, were finally absorbed as integral portions into one or the other more powerful nations whose greater vitality enabled them to overcome greater obstacles'. This study cannot answer these crucial questions. It has a much more limited objective of pointing out some important factors in relationship between Georgia and Russia - Imperial and Soviet - which would contribute to understanding of the extremely complex and ambivalent problem of national self-determination. To simplify the presentation, this paper is divided into three sections: (1) Georgia and Imperial Russia: (2) Independent Georgian Republic; and (3) Georgia as a Part of the USSR.

AD-A093 700/3 PC **A02**/MF **A01**
Department of State, Washington, DC. Office of External Research.
Cuba: The New Orthodoxy and the Resurgence of Fidel,
Edward Gonzalez. 1976, 8p FAR-23525
Prepared in cooperation with California Univ., Los Angeles.

The concluding months of 1975 saw Cuba again in the international spotlight. In November came the first disclosures that Cuban combat forces had been sent to aid the Marxist-oriented and Soviet-backed Popular Movement for the Liberation of Angola (MPLA) in the civil war that had broken out in the newly independent African state. By mid-December, the Cuban build-up was estimated at between 3,000 to 5,000 troops, with the latter employing some 27 shiploads and 30 planeloads of Soviet equipment sent directly to Angola from the U.S.S.R. This was by far the largest contingent of Cuban military personnel sent overseas, dwarfing the 300 to 400 tank crew and air force personnel said to be Syria. While the Cuban involvement on behalf of the MPLA dramatized the Castro government's readiness to render material aid to leftist movements in the Third World, it also illustrated the extent to which Cuban foreign policy had become synchronized with, and supportive of, Soviet international objectives. In the meantime, Cuba's Angolan involvement ended the cautious moves that had been undertaken by both Washington and Havana toward normalizing relations between the two countries.

AD-A093 701/1 PC **A02**/MF **A01**
Department of State, Washington, DC. Office of External Research.
Russian Colonialism and Bessarabia: A Confrontation of Cultures,
Ladis K. D. Kristof. 1974, 21p FAR-20654
Prepared in cooperation with Portland State Univ., OR. Dept. of Political Science. Presented at the International Conference of Slavists at Banff (Alberta), 4-7 Sep 74.

In the original plan (and original drafts) of this paper the attention was focused quite narrowly on colonial policies and the years 1878-1917. However, in the course of research and writing I became convinced that the period I chose to cover was not quite as felicitous, or convenient, as I believed it would, for unless I had access to archival material and put the primary emphasis on the bureaucratic (and mostly local) decision-making level I would not be able to carve for myself a field of research that could be presented in a comprehensible fashion. At the same time, while delving deeper and deeper into the subject, I confess that my interest shifted away from bureaucracy and its colonial policies to colonialism in the broader sense as an expression of certain cultural and demographic trends. My interest shifted because, first, I found it repeatedly difficult to distinguish between what could legitimately be labeled as policy and what

was or may have been (who knows really.) merely an arbitrary decision, a momentary whim, of some gubernila or uezd potentate, or perhaps not even his but of his secretary who prepared the document and just pocketed a bribe of a few rubles in exchange for twisting the legal meaning of the decision one way or another.

AD-A093 770/6 PC **A07**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Where Was the Shah's Army.
Master's thesis,
John M. Smith. 6 Jun 80, 128p AD-E750 048

This study attempts to determine why the Shah of Iran, Mohammad Reza Pahlavi, was successfully overthrown by a religion, Shiite Islam. The investigation is focused on the large and powerful Imperial Iranian Armed Forces, the Shah's political authority for over thirty-seven years, who had been trained and equipped by the US Department of Defense since the early fifties. In 1978, the Islamic clergy led the opposition movement against the Shah of Iran's repressive regime and political rule in the form of mass demonstrations, and during 1978, riots reached into hundreds of cities, towns, and remote villages with fatalities estimated in excess of 5,000. Americans, and westerners in general, know surprisingly little about Iran or its culture; perhaps causing internal problems without ever knowing it. Furthermore, the unprecedented, enormous, and totally indiscriminate military sales to Iran gave the Shah, or his armed forces, a sense of omnipotence. Iran requires a new and probing look based on the events since February 12, 1979, and may force the US to reconsider its position as a major arms merchant; it may further require as assessment of our foreign policy towards the third world. (Author)

AD-A093 830/8 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
Attitudes of Major Soviet Nationalities. Volume I. The Slavs. Introduction. Russia, The Ukraine, Belorussia.
Jun 73, 160p Rept no. C/73/11
Contract IA-16666
See also Volume 2, AD-A093 831.

This volume includes chapters on the Russians, Ukrainians, and Belorussians. Each chapter deals both with the nationality as an ethnic group and with the republic as a political-territorial unit. The Ukrainian and Belorussian chapters are full-length presentations covering all topics listed in the chapter outline on page vi. The Russian chapter departs from this format, concentrating on the relationship of the Russians, as the dominant Soviet nationality, with the many minority nationalities in the USSR. The three nationalities covered in this volume belong to the East-Slav group. There is much affinity among them in language, religion, history, and way of life. They are often regarded by outsiders as one. Yet, there are major differences and cleavages among them, especially between the Ukrainians and the Russians. Recently, this has been manifested by such phenomena as the struggle of the Ukrainians for their national language and the harsh suppression of the national movement in the Ukraine.

AD-A093 831/6 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
Attitudes of Major Soviet Nationalities. Volume II. The Baltics. Estonia, Latvia, Lithuania.
Jun 73, 160p Rept no. C/73-9
Contract IA-16666
See also Volume 3, AD-A093 832.

The Baltic nationalities described in this volume -- the Estonians, the Latvians, and the Lithuanians -- are in a number of ways a distinctive group within the USSR. They are commonly regarded as the most 'Western' among the Soviet nationalities. They share many common features in geography, history, mode of incorporation into the USSR, level of development, and national problems. The Baltic area (except Lithuania in some respects) is regarded as the most highly developed in the USSR.

AD-A093 832/4 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
Attitudes of Major Soviet Nationalities. Volume III. The Transcaucasus. Armenia, Georgia, Azerbaidzhan.
Jun 73, 175p Rept no. C/73-10
Contract IA-16666
See also Volume 4, AD-A093 833.

The Transcaucasus is a relatively small but populous area consisting of the republics of Armenia, Georgia, and Azerbaidzhan. Located at the crossroads of Europe and Asia, between the Black Sea and the Caspian Sea, the area has historically been subject to expansionist pressures from Iran, Turkey, and Russia. After the 1917 Revolution in Russia the three republics experienced a brief period of independence, terminated by a victory of the Red Army. With the formation of the USSR in the early 1920s, the three republics were combined in a single Transcaucasian Soviet Federation of Socialist Republics. In 1936 they became separate union republics.

AD-A093 833/2 PC **A14**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
Attitudes of Major Soviet Nationalities. Volume IV. Central Asia. Kazakhstan, Kirgizistan, Turkmenistan, Uzbekistan, Tadzhikistan.
Jun 73, 319p C/73-12, FAR-19575
Contract IA-16666
See also Volume 5, AD-A093 834.

This volume includes the following chapters: KAZAKHSTAN; KIRGIZISTAN; TURKMENISTAN; UZBEKISTAN; and TADZHIKISTAN.

AD-A093 834/0 PC **A11**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
Attitudes of Major Soviet Nationalities. Volume V. Other Nationalities. The Jews, The Tatars, Moldavia, Comparative Tables.
Jun 73, 229p Rept no. C/73-13
Contract IA-16666
See also Volume 1, AD-A093 830.

The inclusion of the three nationalities named does not imply that these nationalities are alike. Rather, they are included here since they did not fit in any of the other groupings. The Moldavians, though they have a Union Republic of their own, do not belong to any 'group' in the USSR. The Tatars and the Jews were selected from among the many non-union nationalities: the Tatars because they are a well-known and rather important ethnic group in the heartland of the European RSFSR; the Jews because of the importance and topicality of their case. The Tatars have an Autonomous Republic but also a large dispersed population in the USSR. Officially, the Jews have an autonomous province in Birobidzhan, but in reality they are a dispersed people, of whom only a tiny minority live in this 'Jewish province.'

AD-A093 865/4 PC **A15**/MF **A01**
National Security Affairs Inst., Washington, DC.
Rethinking US Security Policy for the 1980s. Proceedings of the Annual National Security Affairs Conference (7th) held 21-23 July 1980, Fort McNair, Washington, DC.
1980, 328p Rept no. 7

As the United States enters the 1980s, unforeseen events have altered the national security policy environment and dictated a reexamination of many important security policy areas. Clarity of perspective and an understanding of the issues and opportunities contained within these challenges are fundamentally important to the development of policy initiatives for the future. This Seventh Annual National Security Affairs Conference (NSAC) attempted to focus the attention of a select group of scholars, businessmen, decisionmaker, and observers on several key issues in order to articulate perspectives, sharpen understanding, and suggest policy alternatives. Several factors have shaped the challenges of the early 1980s. Unfolding events in Iran and Afghanistan have been met by sometimes divergent US and allied responses. The United States is reconsidering its historic geographic priorities for force deployment and, with consideration of SALT II suspended, the strategic balance between the United States and the Soviet Union is at question. In a quieter vein, US and Chinese relations have multiplied since the reemergence of China as a full participant in world politics and since the normalization of relations with the United States. Longer range challenges concern the potential of US technology to assist in meeting these shifting realities, and the US capability to improve the integration of its technologies, policies, and strategies.

AD-A093 884/5 PC **A08**/MF **A01**
University of Southern California, Los Angeles. International Relations Research Inst.
Dangers Files Data: January-February 1979,
Charles A. McClelland, and Jeffrey D. Simon.
May 79, 173p
Contract MDA903-74-C-0289, ARPA Order-2712

The first two months of 1979 registered more stress in the world than has been reported for some time--possibly since the summmer of 1974. Dangers files (D-files) reports analyzing some of these situations have already been issued, and further papers are forthcoming (Simon 1979a, 1979b). This volume reproduces the 1979 data upon which part of the analyses have been based. Each data item consists of a line of codes followed by a descriptive account of the threat situation. A full explanation of the methodology of the coding scheme can be found in an earlier paper (McClelland 1978). Included in the code line are the date of the item, sequence number, source, judge, country (maximum of 3), level (domestic, international, global), category (apprehension, agitation, life support breakdown, accident/natural disaster, assault, warfare), and judge's assessments (degree of severity, anticipated development (tilt), speed and spread). The text consists of an abbreviated account of the situation as abstracted from either the New York Times or the Los Angeles Times.

AD-A093 986/8 PC **A04**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Greece and NATO: Problems and Prospects.
Master's thesis,
Rosario Nicholas Palarino. 6 Jun 80, 75p AD-E750 053

This study analyzes the relationship between Greece and NATO. The investigation focuses on Greece's accession into the Alliance, its eventual departure from the Organization, the current situation between Greece and NATO, and an assessment of the reasons Greece is important to the defense agreement. Investigation reveals that Greece's accession into the Alliance was directly linked to American involvement in that country. However, Greece's departure was caused by a variety of reasons, the most important being that of Cyprus. Current negotiations are ongoing between Greece and NATO to reintegrate it into the military structure, however many disagreements are hindering the talks. The main issue concerns the control of airspace over the Aegean. Further examination reveals Greece is a very important member of the Alliance and if not reintegrated quickly, a possible further disintegration of the southern flank could occur. (Author)

AD-A093 987/6 PC **A05**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Henry L. Stimson and the Japanese Dilemma, 1931-1932.
Master's thesis,
Harry T. Newman. 6 Jun 80, 88p AD-E750 052

This study addresses Henry L. Stimson, as Secretary of State under President Herbert Hoover, and his influence on American foreign policy toward Japan following the Japanese military action in China that has become known as the Manchurian Incident. Specifically examined are the questions of when and why Stimson's attitude toward Japan changed from one of support for the civilian government in their effort to control the military to one of leading a determined effort toward international moral condemnation of Japan. As background, the study examines in detail, the U.S. and Japanese foreign policies the decade prior to 1931, the character of Stimson, and then Stimson and Japan during the period, 1931-32. Research, using espe-

cially Stimson's personal diaries, suggests that the cumulative effect of probably five separate events contributed to the change in attitude rather than a single instance. And coupled with these five events, Stimson's friendship and confidence in Japanese leaders hindered his decision to adopt a stronger position against Japan sooner than he ultimately did. (author)

AD-A093 988/4 PC **A04**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Coup and Conscience: Approaching an American Threshold.
Master's thesis,
Theodore M. Moscheau. 6 Jun 80, 56p AD-E750 055

This study examines conditions which are influencing the American military to approach a behavioral threshold in civil-military relations. This threshold is a point of departure from traditional subordinated behavior. At the threshold a divergence is forecast toward either: (1) direct intervention into government (coup d'etat), or (2) institutional autonomy within government (substantive behavior). The central issue is an unresolved relationship between temporary partisan civilian regimes and enduring military professionalism. Research is focused on the influences of a professional heritage and on contemporary environmental stress upon military behavior in American civil-military relations. Research reveals that perceptions of regime legitimacy significantly affect the liklihood of crossing the American threshold. Key variables in the contemporary environment are found to be: (1) a definition of professionalism weighted with national vs. regime loyalty, and (2) a perception by the military of an accelerating external threat to national survival which is not perceived by the society it serves. (Author)

INIS-mf-5874 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Power and Reactors.
Decree-Law No. 361/79 of 8 August 1979 Determining the Structure and Competence of the National Laboratory of Industrial Engineering and Technology.
1 Sep 79, 15p
In Portuguese.
U.S. Sales Only.

This Decree-Law determines the structure and scope of the National Laboratory of Industrial Engineering and Technology (LNETI) which now includes the Nuclear Physics and Engineering Laboratory of the Junta de Energia Nuclear and its central services. The nuclear activities of the LNETI are divided into three sectors: the Department for Radiological Protection and Safety, responsible for radiation protection in nuclear installations and for the safety of nuclear equipment; the Department for Energy and Nuclear Engineering, responsible for R and D in nuclear engineering and for nuclear energy production; and finally, the Department for Nuclear Science and Technology, in charge of R and D in nuclear science and of promoting the application of nuclear technology for peaceful purposes. (Atomindex citation 11:542076)

5E. Human Factors Engineering

AD-A093 539/5 PC **A07**/MF **A01**
Anacapa Sciences, Inc., Santa Barbara, CA.
Engineer's Guide to the Use of Human Resources in Electronic System Design: an Evaluation.
Special rept.,
R. A. Dick, and Ernest A. Koehler. Nov 80, 137p NPRDC-SR-81-3
Contract N00123-79-C-1335

For several years, the Navy has been unable to provide sufficient numbers of adequately skilled operators and maintainers for sophisticated shipboard electronic systems. Manpower problems in operating and maintaining these systems are widely recognized in the Navy and in the Office of the Secretary of Defense. To deal with these problems, the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) has outlined new constraining requirements for dealing with manning support problems before final decisions are made to acquire new major systems. Also, the Navy has begun a program to document and, eventually, monitor and control the problems in matching manpower resources with new system hardware requirements. The intent of this program, which was called the HARDMAN Program, was to develop a regulatory structure to ensure that manpower requirements would become a major factor in making system acquisition and design decisions. To support ASD requirements and complement the HARDMAN regulatory structure, the Navy Personnel Research and Development Center began development of the Engineer's Guide to the Use of Human Resources in Electronics System Design. The purpose of the guide was to provide a data base that would help the Navy acquisition and development community and the contractor design community to develop electronic systems that require fewer human resources--in terms of both numbers and skill levels. It was a first attempt at assembling existing data, gathering new pertinent data, and packaging the data in a document that could be called out by system acquisition and development organizations and implemented by design engineers.

AD-A093 814/2 MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Effects of Headgear and Visual Angle on Head Rotation Spectral Characteristics.
Technical rept.,
D.K. Shirachi, D. L. Monk, and J. H. Black, Jr. 1976, 16p Rept no. AFAMRL-TR-76-68
Availability: Microfiche copies only.

Dynamic characteristics of the unrestrained human head movement control system are measured as a function of headgear weight and size of the stimulus trajectory envelope. The coherence, gain and phase spectral characteristics are unaffected by variations in the weight of the helmet and associated head line-of-sight measurement hardware; however, a gain amplitude nonlinearity related to stimulus visual field size is shown to exist. (author)

AD-A093 937/1 PC **A03**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Pilot Reactions to Optical Defects Found in F-111 Bird Impact Resistant Windscreens.
Technical rept. Oct 78-Sep 79,
Shelton MacLeod, and Robert G. Eggleston. Dec 80, 38p Rept no. AFAMRL-TR-80-4

A field study was conducted to assess the scope and severity of mission-related optical problems associated with the new F-111 Bird Impact Resistant Transparency (BIRT) windscreen. Data for this study was gathered from an 81-item questionnaire and used to scale the opinions of 33 USAFE pilots. Principal findings indicate that: (1) Distortion is perceived as the most disruptive optical factor followed in order by multiple images, haze and rainbowing. (2) The worst combination of optical defect and flight task is multiple images during night approach and landing. (3) The extent to which BIRT optical problems are perceived as impairing mission performance is sufficiently great to further justify research for improving windscreen optical quality. (4) Pilots with very limited amounts of BIRT flying time (20-80 hours) are less likely to perceive windscreen optical problems than a middle experience group (with 100 to 180 flying hours). This difference is attributed to a lack of exposure to the optical effects; and (5) Pilots with relatively extensive BIRT flying experience (over 200 hours) are also less prone to perceive windscreen problems than the middle experience group. This difference is attributed to the effect of a period of adjustment to the optical anomalies.

AD-A093 991/8 PC **A03**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
A Predictor of Human Visual Performance (PREVIP) at Form Discrimination Tasks.
Technical rept.,
Roger A. Gagnon. Dec 80, 42p Rept no. AFAMRL-TR-80-1

This technical report presents an algorithm which implements the form (Shape) discrimination task performed by a model of the human visual system. This task is important because there is no known method by which the suitability of a symbol set can be evaluated without conducting expensive and time consuming psychophysical tests. The algorithm reported herein is a PREdictor of Visual Performance PREVIP) at visual discrimination tasks. PREVIP is also used to display the results of the spatial frequency filtering performed by the model and to test the modeling of new tasks. PREVIP accepts a digital representation of a set of visual stimuli and applies a preprogrammed visual response filter. PREVIP then uses these filter outputs to compare the stimuli against a set of previously defined prototypes. This procedure generates a distance metric upon which visual discrimination errors are predicted or against which human errors can be correlated. PREVIP can also be used to test new visual prediction tasks and visual model improvements. Improvements to be included in future versions of PREVIP are: stimulus contrast and illumination effects, masking phenomena, and peripheral visual tasks. (Author)

PB81-144719 Not available NTIS
National Bureau of Standards, Washington, DC.
A New Bioclimatic Chart for Passive Solar Design,
Edward Arens, Richard Gonzalez, Larry Berglund, Preston E. McNall, and Lutfi Zeren. Oct 80, 5p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Proceedings of the American Society of the International Solar Energy Society and National Passive Solar Conference Annual Tech. Conference Passive Systems Div. (5th), University of Massachusetts, Amherst, October 19-26, 1980, p1202-1206 Oct 80.

The paper presents a substantially revised version of the original bioclimatic chart developed by Olgyay and Yagiou in the 1950s, incorporating recent research results. A thermophysiological model developed at the J.B. Pierce Foundation Laboratory was used to simulate the thermal behavior and resulting comfort sensation of an individual at two clothing levels, and a rate of activity typical of office work, house work, or shopping. The criteria for the boundaries of the comfort zone are based on ASHRAE Standard 55-74, as currently being proposed for revision. Examples of the chart are presented, both in the original format and in the format of the psychrometric chart.

PB81-157505 PC **A14**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Building for People: Behavioral Research Approaches and Directions.
Final rept.,
Arthur I. Rubin, and Jacqueline Elder. Jun 80, 317p NBS-SP-474
Library of Congress catalog card no. 80-600065.

The primary goal of this report is to acquaint the practicing architect and the architectural student with the potential contributions of the social sciences to the solution of building design problems. The report is divided into seven major parts, each part containing several chapters. Part I explores problems connected with today's buildings and advocates a design approach based on a team concept including architects, behavioral researchers, and engineers. Part II takes up the scientific approach to research, stressing the need for employing experimental controls and systematic procedures to collect objective data. Parts III, IV, and V describe methods employed by researchers to collect Man/Environment (M/E) data. The emphasis is on the need to develop systematic procedures to collect information, because only in this way can significant progress be made in developing a discipline of M/E studies. Part VI summarizes the major points and indicates approaches and directions for developing such a discipline. Part VII contains reference information to broaden the perspective of the reader with respect to M/E issues. The final part of the work contains a glossary, bibliographic information, and an index.

PB81-803637 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Signs and Display Systems: Graphic Design and Human Engineering. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 224p
Supersedes PB80-803158, and NTIS/PS-78/1195.

The bibliography contains annotated references to research reports covering varied aspects of design of signs and displays, particularly in the transportation field. Specific topics include: highway sign design; highway sign legibility; traffic control devices; transportation graphics; visual perception of aircraft instrument display systems; human engineering of symbols; and legibility of maps. (This updated bibliography contains 216 citations, 27 of which are new entries to the previous edition.)

5F. Humanities

PB81-145716 PC **A06**/MF **A01**
Water and Power Resources Service, Boulder City, NV.
A Cultural Resources Survey of the Zuni River from Eustace Reservoir to Bosson Wash, Zuni Indian Reservation, McKinley County, New Mexico,
Barbara E. Holmes, and Edmund J. Ladd. Mar 80, 107p

The Zuni Archaeology Program conducted a cultural resources survey of a right-of-way for a proposed river lining project along the Zuni River from Eustace Reservoir to Bosson Wash. The river lining project is being considered as an alternative to the Yellowhouse Dam. The project area was investigated by an intensive archaeological survey and interviews. Five prehistoric sites, three prehistoric/historic sites, and 22 historic sites were recorded.

5G. Linguistics

AD-A093 952/0 PC **A03**/MF **A01**
Systems Research Labs., Inc., Dayton, OH.
Studies in Tactical Symbology. II. Symbol Meaningfulness and Learning Efficiency.
Technical rept. Sep 77-Jun 78,
William H. Pearson, and Robin L. Shew. Nov 80, 26p AFAMRL-TR-80-115
Contract F33615-79-C-0503
See also report dated Feb 79, AD-A070 706.

A symbol association study was conducted to select from among three symbol sets a 'best' set to convey tactical order-of-battle information on a CRT display to a pilot of a single-seat fighter aircraft. The three symbol sets were: (1) a set recommended by a panel of Air Force experts (SSC), (2) a set of pictorial symbols resembling the objects they were to represent, and (3) a set of geometric symbols with alphanumeric modifiers. The latter two symbol sets were composites based on symbols constructed by Air Force tactical pilots in an earlier experiment. The criteria used to select the 'best' symbols were: (1) fewest trials and least time to learn; (2) fastest recognition time for meaning; and (3) ease of display, i.e., fewest number of lines to generate the symbol. Each symbol set was viewed by ten separate college students with some military experience. After each symbol was presented, the subject picked its meaning from a list on a graphic display device driven by an IBM 370/155 computer which controlled the symbol presentation and calculated learning scores, i.e., recall times, trials to learn, etc. On the basis of the first two criteria, symbols from the pictorial set were selected for aircraft and naval vessels and objects/events pertaining to them. The remainder of the symbols were selected on the basis of ease of display and originated about equally from all sets. (Author)

5H. Man-Machine Relations

AD-A093 548/6 Not available NTIS
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Three-Dimensional Motion Estimation,
R. Y. Tsai, and T. S. Huang. 1980, 7p ARO-16948.2-A-EL
Contract DAAG29-79-C-0200
Availability: Pub. in Signal Processing: Theories and Applications, p263-269 1980 (No copies furnishd by DTIC/NTIS).

No abstract available.

AD-A093 594/0 PC **A02**/MF **A01**
Wharton School, Philadelphia, PA. Dept. of Decision Sciences.
Research and Practice in Office Automation.
Technical rept. Apr 80-Mar 81,
Howard Lee Morgan. Apr 80, 10p Rept no. 80-03-12
Contracts N00014-75-C-0462, MDA903-80-C-0093
Pub. in Information Processing 80, p783-789 1980.

No abstract available.

AD-A093 626/0 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The Effects of Multiple Anthropometric Constraints on the Accommodation of Personnel in Operational Naval Aircraft.
Master's thesis,
James Clayton Bartholomew. Sep 80, 120p

All Navy aircraft are required to accommodate, anthropometrically, ninety percent of the user population. Some designs have been criticized for their low accommodations but those accommodations have never been quantified. The purpose of this thesis was to quantify the accommodation, by each type of operational Naval aircraft, of populations of Naval aviation personnel of 1964, 1969, and 1975. The Computerized Accommodation Percentage Evaluation (CAPE) model was used to generate data points since only summary statistics were available for two of the populations. Each subject of every population was checked against the requirements of the design specification, and against the limitations of each aircraft. All aircraft were found to accommodate more than ninety percent of the 1975 population. Time related changes in the populations were noted and unexplained inconsistencies in the data were discovered. Possible sources of error were discussed and potential solutions proposed. (Author)

AD-A093 734/2 PC **A04**/MF **A01**
Applied Digital Communications, Moorestown, NJ.
Flight Training Simulator: Surface Texturing via Pseudo Random Noise Codes.
Final rept.,
Joseph F. deSpautz, Michael B. Bender, and Virginia M. McNamara. Dec 80, 65p AFHRL-TR-80-13
Contract F33615-77-C-0068

Increased use of infrared and low light level television systems within the operational environment has presented increasingly difficult problems to the technology of simulation systems in the area of target identification, textural cues, and simulation fidelity. The principal effort reported here has been to develop a software simulation using cyclic codes for providing surface texture without the use of typical computer image generation (CIG) edge-type algorithms. The latter type algorithms, when used to provide valid and realistic surface detail, cause the edge processing load to exceed system capability. Cyclic code techniques provide a compact texture data base definition that is versatile, has substantial total assignment capability, and is based on real-time simulation concepts. The simulator system was delivered and made operational on the Sigma 5 facility using the ACTES facility for offline video data storage, retrieval and display. The software is user interactive from a remote terminal and includes capabilities for modeling the data base, display characteristics, aircraft positioning, and simulator control of printouts and default options. (Author)

5I. Personnel Selection, Training, and Evaluation

AD-A093 501/5 PC **A02**/MF **A01**
Defense Activity for Non-Traditional Education Support, Pensacola, FL.
Capability of Colleges and Universities to Offer Graduate Degree Programs in Shortage Disciplines as Part of the Military Voluntary Education Programs.
Final rept. Mar 79-Jun 80,
Rufus E. Rose, Jr. Jun 80, 22p Rept no. DANTES-3-80

In response to Congressional and OSD inquiries, the Services conducted surveys of junior officers to determine their interest in the disciplines in which there were the most extreme shortages of officers with master's degrees. DANTES conducted the college and university survey (the subject of this report) to determine the capability of offering degree programs in the shortage disciplines on or near bases. There are opportunities for Education Services Officers to promote study in the shortage areas where there is a 'match' between officers' interests and institutions' capabilities. (Author)

AD-A093 508/0 PC **A04**/MF **A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Management Engineering Team Application of Officer Grade Requirements Method.
Final rept.,
Kenn Finstuen, Gary N. Matthews, and William H. Pope. Dec 80, 71p Rept no. AFHRL-TR-80-32
See also Rept. nos AFHRL-TR-80-31 AD-A093 283 and AFHRL-TR-75-80, AD-A025 309.

This report presents detailed results of a large scale Management Engineering Team (MET) application of the Officer Grade Requirements (OGR) methodology. The OGR technology was applied to determine the appropriate grades for non-aircrew Air Force officer positions based on job content and resopnsibility. Based on data from over 11,000 position descriptions collected by METs and MET ratings of representative sample of descriptions from the original OGR project the following major steps were accomplished: development of an efficient linear regression equation for grade determination, construction of a stable grade conversion table, and computation of validity and reliability information concerning MET rating behavior. These analyses indicated that METs apply the technology in a systematic and reliable manner, resulting in a defensible statement of the appropriate military grade for a given non-aircrew job. (Author)

AD-A093 512/2 PC **A03**/MF **A01**
Tactical Air Command, Langley AFB, VA. Concepts Div.
System Operational Concept for the Aerial Gunnery Target System.
21 Nov 80, 26p Rept no. TAC/XPJ-C-80-004

This document establishes an operational concept for the A/A 37U-33 Tow Target as the Aerial Gunnery Target System(AGTS). It will be used as a basic reference from which detailed resource requirements and implementing programs can be derived. The A/A 37U-33 will be employed as a towed aerial target, for use by tactical fighter aircrews in developing and maintaining air-to-air gunnery skills. This concept outlines employment of the AGTS. (Author)

AD-A093 541/1 PC **A08**/MF **A01**
Office of the Chief of Staff (Army), Washington, DC. Management Directorate.
The Army Study Program.
Rept. for FY 1981.
9 Oct 80, 175p

The FY81 Army Study Program herein presented includes command and agency study program agendas for the period. The study program will be updated on a quarterly basis and reviewed by the Study Program Coordination Committee. Accomplishment of individual study efforts and allocation of necessary funds are separate actions to be taken in accordance with AR 5-5. Better Army studies will result from better assessment of problems before studies are undertaken, better application of analytic resources, and better use of

completed products - the bottom line for improving the quality of studies and ensuring that the right problems are studied. (Author)

AD-A093 588/2 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Evaluation of Financial Management Education and Training Provided Marine Officers with the Primary 3415 MOS.
Master's thesis,
Johnie Gombo. Sep 80, 89p

This thesis evaluates the adequacy of the financial management education and training provided to Marine officers with the primary 3415 Military Occupational Specialty (MOS). Utilizing the responses from a financial management education questionnaire, which was distributed to Marine Corps financial management organizations, the thesis compares the respondents perceived education and training needs with the respondents actual education and training. The author concludes that the programs, although not entirely adequate, fulfill the minimum needs of the officers. The author recommends that to correct those inadequacies, which were reported: (1) the course of instruction at the Fiscal Accounting Clerks Course needs to be improved and (2) the officers with the primary 3415 MOS, to obtain a graduate degree in a financial management discipline, need to be given preference in selection to a graduate school. (Author)

AD-A093 589/0 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Financial Management Training for the Unrestricted Line Officer.
Master's thesis,
Peter P. Bialobrzewski. Sep 80, 134p

This thesis examines the aggregate Unrestricted Line Officer financial management responsibilities of commanding officers, executive officers, department heads and division officers as found in public law and Navy Regulations, and compares that aggregate with the contents of current career development courses, management training courses, guidebooks, and major financial correspondence courses. This examination concludes that normal career development courses are inadequate to prepare officers for their responsibilities. However, there appears to be a sufficient number of specialized financial courses to meet aggregate responsibilities. The thesis then attempts to measure (1) the current financial knowledge level of Naval officers, and (2) the impact the specialized courses and one of the guidebooks have had on improving this knowledge level utilizing two surveys conducted at the Naval Postgraduate School. In conclusion, the thesis makes several recommendations for increasing the availability of financial training to the line officer by incorporating it into normal career development courses. It also presents a guidebook developed by the author which can be used in formal training programs or as an ancillary training aid/reference publication for those individual who have not or will not have an opportunity to receive formal financial management training. (Author)

AD-A093 590/8 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Attrition of PMU Personnel Compared to Attrition from the U.S. Navy Male Enlisted Population.
Master's thesis,
Marvin E. Butcher, Jr. Sep 80, 204p

This thesis is a study of the difference in first-term personnel attrition between the Positive Motivation Unit (PMU), RTC Great Lakes, Ill. and a sample of the U.S. Navy male recruit population (control), for a period covering January 1977 through September 1979. Eleven cohorts, of 90 days each, for the PMU and control groups were tracked over the period (1977-1979) and their attrition rates were compared. Cross-tabulation, discriminant, and multiple regression analysis were performed to examine PMU and control groupings and their observed attrition. The traditional biographic/demographic variables explained only a small portion of the variance in the dependent variable (survival), while the inclusion of certain situational variables, such as initial duty assignment, greatly increased the accuracy of the prediction of survival, for both the PMU and the control groups. The results of this study indicate that attrition has some determinants that are somewhat controllable by the Deputy Chief of Naval Operations (Manpower, Personnel, and Training). These determinants should aid Navy managers in preparing initiatives to combat attrition. (Author)

AD-A093 600/5 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The Development of the Junior Level Army Financial Manager.
Master's thesis,
Robert B. Tully, and John R. Batiste. Sep 80, 158p

This thesis is an analysis of the degree of job preparation manifested by Army junior level financial managers in their first comptroller related assignments. The research stemmed from a perception, developed from interviews, that all is not well within the comptroller community. It identifies those comptroller functional responsibilities where the young manager has not performed to expectations or where the officers are not adequately prepared to perform their duties. The authors accomplished this research by means of a survey questionnaire and an examination of recent audit report findings on the subject. Functional responsibility shortcomings to the Army financial management system and curricula of ongoing comptrollership courses. The study culminates with a proposal for an Army practical comptrollership course and a financial management intern program designed to deal with the identified comptroller job preparation shortcomings. (Author)

AD-A093 678/1 PC **A02**/MF **A01**
Office of Naval Research, London (England).
Marine Science in Southern Wales.
Technical rept.,
Wayne V. Burt. 5 Nov 80, 10p Rept no. ONRL-R-4-80

Marine science programs are concentrated in the cities of Swansea and Cardiff. Marine research is being carried out in the departments of oceanography, chemistry, chemical engineering, economics, geography, metallurgy and materials science, mechanical engineering, civil engineering, geology, and zoology at the University College of Swansea. The Department of Maritime Studies at the University College of Wales in Cardiff has research and instructional programs in maritime technology, maritime geography, maritime commerce, sea law and policy, shipping economics, marine geology, and marine meteorology. Some deep sea and Bristol Channel seismic research is also underway in the Geology Department of the University College of Wales in Cardiff. (Author)

AD-A093 686/4 PC **A02**/MF **A01**
Maryland Univ., College Park. Coll. of Business and Management.
The Effects of Self-Set, Participatively Set, and Assigned Goals on the Performance of Government Employees.
Technical rept.,
Gary P. Latham, and Herbert A. Marshall. Jan 81, 13p Rept no. GS-5
Contract N00014-79-C-0680
Prepared in cooperation with Washington Univ., Seattle. Graduate School of Business Administration.

A government agency wished to define effective supervisory behavior. Fifty-seven government employees participated in the job analysis. The employees were randomly assigned to one of three goal setting conditions, namely, self-set, participatively set, and assigned goals. The task required each individual to brainstorm individually job behaviors that he or she had seen make the difference between effective and ineffective job behavior as a supervisor. Goals were set in terms of the number of behaviors to be listed within 20 minutes. There was no significant difference in goal difficulty between those with participatively set goals and those with self-set goals. Goal difficulty was held constant between the participative and assigned goal conditions by imposing a goal agreed upon by an employee in the participative condition upon an employee in the assigned condition. There was no significant difference among the three goal setting conditions regarding goal acceptance or actual performance. This was true regardless of employee age, education, position level, years as a supervisor, or time employed in the public sector. The correlation between goal difficulty and performance was .62, .69, and .74, respectively, in the participative, self-set, and assigned goal conditions. (Author)

AD-A093 756/5 PC **A09**/MF **A01**
Department of Defense, Washington, DC.
A Study of the Market Potential for Recruiting Non-Prior Service Females for Military Service. Volume I.
May 80, 198p

This study is reported in two volumes: Volume I, which reports the background, purpose and results of this research project; and Technical Appendix, which details the methodological approach employed and analyses of the data conducted to address the stated purpose of this study. The first volume of the report consists of four basic sections: an Executive Summary which summarizes the conclusions and implications drawn from this study and the key findings on which they are based, the Introduction which reviews the background of this study, specifies its stated purpose and outlines the required research objectives to address this purpose, the Methodology which briefly presents an overview of the study design, sampling plan, and interviewing procedures, and the Findings section which discusses detailed findings from this study resulting from the analysis of the data on propensity to enlist under current perceptions of the military and propensity for enlistment under the two alternative conditions studied.

AD-A093 767/2 PC **A07**/MF **A01**
Veda, Inc., Arlington, VA.
F-14 Instructional System Development Program.
Final rept. Aug 77-Sep 80,
Robert R. Geary, and Fritz H. Brecke. Nov 80, 136p VEDA-53247-80U/P0025,
NAVTRAEQUIPC-78-C-0004-1
Contract N61339-78-C-0004

The F-14 Aircrew Instructional Systems Development project consisted of a complete revision of a training system using MIL-T-29053, Training Requirements for Aviation Weapon Systems. This project was the first large scale application and validation of the Military Specification. The project consisted of a complete redesign of the F-14 pilot and Naval Flight Officer training syllabi. Starting with an existing task listing, learning objectives were developed and organized into prerequisite hierarchies. These learning objectives were then segregated and grouped to form the training events of the syllabi. A delivery system was defined on the basis of an in-depth training support requirements analysis. The delivery system was based exclusively on already existing media resources and optimized the use of instructor time by reducing instructor involvement in academics and increasing the amount of simulator training. The lesson specification as an intermediate step between syllabus event definition and course material production proved to be an efficient design step. The project resulted in an up-to-date training system designed specifically to meet the unique requirements of the two user squadrons and capable of being maintained by those squadrons. The project also demonstrated the basic validity of the military specification and the corresponding data item descriptions. Several recommendations were made and subsequently incorporated in these regulatory documents. (Author)

AD-A093 769/8 PC **A05**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
American Pilots in the Battle of Britain.
Master's thesis,
John D. Lauher. 6 Jun 80, 79p AD-E750 049

This study determines the extent of American pilot participation as members of the Royal Air Force flying in the Battle of Britain. It also examines the recruiting mechanism by which the Americans became involved in the war and documents their contributions as combat pilots during the battle itself. Research reveals that, while many American citizens were recruited to fly for Britain during the summer of 1940, only six Americans are known to

have actually participated in the Battle of Britain, fought between 12 August and 15 September 1940. These men not only demonstrated America's determination to support her allies, but materially contributed to Britain's cause by destroying two and one half enemy aircraft, probably destroying five others, and damaging two more during their brief RAF careers. (author)

AD-A093 781/3 PC **A08**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Determining Ultimate Proficiency Levels Attainable by Low-Ability Military Personnel
Final rept.,
Jul 74, 164p Rept no. HUMRRO-FR-WD(C)-74-2
Contract DAHC19-73-C-0004

Basic Research 21 is a project to expand the proficiency levels attainable by personnel now test-classified as low ability. Statistically, these men are the category which causes the highest rate of discipline and attrition problems. This report represents the conclusion of a contract with ARI. A history of the evolution of the model to its current state can be found in Chapter III. A description of the structure and function of the model in its present state appears in Chapter I, and data currently available is presented in Chapter II. (Author)

AD-A093 807/6 PC **A03**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Selective Retention: A Longitudinal Analysis. III. A Comparison of Recruit Training Attrities, Delayed Graduates, and Graduates.
Rept. no. 3, Jun 77-Oct 78,
Arthur J. Farkas. Dec 80, 33p Rept no. NPRDC-TR-81-3
See also Rept. no. 2, AD-A084 033.

The objective of this effort was to compare the attitudinal responses, collected during the first and last weeks of recruit training, of recruits who were discharged during recruit training (attrites), those who graduated from recruit training after a delay for remedial or medical treatment (delayed graduates), and those who graduated from recruit training without delay (graduates). At the beginning or recruit training, the attitudes, of delayed graduates and graduates were similar and were significantly more positive than those expressed by the attrites. At the end of training, delayed graduates and graduates exhibited a large number of attitudinal differences. The delayed graduates reported more negative experiences during recruit training, less intention to complete their enlistment, less satisfaction with the Navy, and less commitment to the Navy than did the graduates. The delayed graduates also experienced a higher rate of post recruit training attrition during the first 20-21 months of the first enlistment than did the graduates. (Author)

AD-A093 837/3 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Organizational Conditions Affecting Withdrawal Intentions and Decisions as Moderated by Work Experience,
James M. La Rocco, and Allan P. Jones. 5 May 80, 12p Rept no. NAVHLTHRSCHC-77-33
Pub. in Psychological Reports, v46 p1223-1231 1980.

No abstract available.

AD-A093 946/2 PC **A03**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Mathematical Requirements in Navy Class 'A' Electronics Schools.
Rept. for 1 Feb-1 Nov 78,
Jane Sachar, and Meryl S. Baker. Dec 80, 37p Rept no. NPRDC-TR-81-4

Instructors in 14 Navy electronics 'A' schools (12 basic core and 2 advanced) were presented with a list of 70 mathematical skills and asked to indicate (1) how important they were to successful school performance and (2) whether they were prerequisite, reviewed, or taught in the 'A' schools. Also, they were asked to state the number and type of performance aids used in the course and during the exam. Responses showed that, of the 70 skills surveyed, 19 do not appear in any basic core course and 2 more do not affect performance. Although the skills rated as affecting performance are generally considered as prerequisite in all schools, many students require review in these skills for successful performance. Across all schools, the most important skills are (1) addition, subtraction, multiplication, and division of numbers, (2) squares and square roots of positive numbers, (3) addition and subtraction of like units, (4) multiplication and division of like and/or unlike units, (5) substitution of known values into a given formula, and (6) transpositions of algebraic expressions. Performance aids are permitted in all courses but one, both during the course and during exams.

AD-A093 984/3 PC **A05**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Development of Performance Indicators for the Selection and Promotion of Corps Managerial Talent.
Final rept.,
Wayne D. Veneklasen. Nov 80, 93p Rept no. CERL-TR-P-116

The primary objective of the research reported here was to develop a set of preliminary selection and promotion techniques to optimize the quality of the managers responsible for the day-to-day operations of the Army Corps of Engineers. Eight procedures were developed to provide information in four areas. The first area focuses on the job itself and the activities of the position. The Job Activities Description is a questionnaire providing information on the importance of and time spent on relevant job activities. The second area is relevant to the candidates for an open position or promotion and obtains specific information about performance characteristics. Three separate procedures are described for gathering such information: peer rankings, ratings by immediate supervisors, and ratings by second-level supervisors. The third area is also relevant to the candidates but involves information about personal characteristics. Again, three separate procedures are described: the Biographical Inventory: Form V2, the Biological Sketch, and the Interviewing Guide. The fourth area concerns the total organization and the job's place within it. This information is provided by the Management Audit Survey, which assesses the organization's climate by surveying all employees. These instruments have been developed over the past 3 years, and pilot data have been collected. The procedures are now ready for field testing. (Author)

AD-A094 007/2 PC **A06**/MF **A01**
Far West Lab. for Educational Research and Development, San Francisco, CA.
A Model for Education and Training for a Crisis-Expectant Period.
Final rept. 1 Sep 79-31 Oct 80,
John W. Thomas, Diana P. Studebaker, Mary Bradish, and Bela H. Banathy. 31 Oct 80, 105p
Contract EMW-C-0017

A model of an education and training system is presented. The system is designed to provide all necessary instruction and instructional support services for informing and guiding the behavior of the adult U.S. population during an emerging nuclear crisis. The model was developed in order to describe and organize the various environmental constraints, instructional needs, and system requirements that must be accommodated in a 'crisis-expectant' education and training system. These latter system requirements include adaptability to various audiences, expandability during a crisis, and utility for peacetime disasters. These and other requirements for the model are presented in Chapter One of the report. Chapter Two provides literature analyses for the four principal factors governing the design of the instructional materials: the audience, the context for system deployment, behaviors required in a crisis, and instructional format options. Chapter Three synthesizes input information into sets of requirements, displays instructional options, describes alternative deployment scenarios, and presents an evaluation of extant instructional programs. A composite model of an education and training system is then presented along with system variations appropriate for the three training scenarios. Suggestions for the implementation and delivery of the system are also included in this chapter. (Author)

AD-A094 021/3 PC **A04**/MF **A01**
Systems Research Labs., Inc., Dayton, OH.
Subsidiary Radio Communications Tasks for Workload Assessment in R&D Simulations. I. Task Development and Workload Scaling.
Technical rept. 2 Jan-30 Jun 80,
Clark A. Shingledecker, Mark S. Crabtree, John C. Simons, John F. Courtright, and Robert D. O'Donnell. Dec 80, 61p SRL-TSG-TR-80-07, AFAMRL-TR-80-126
Contract F33615-79-C-0503

Primary task interference and poor operator acceptance are problems associated with secondary task measures of aircrew workload which limit their usefulness during the later stages of system development. A possible solution to these problems would be to design secondary tasks which are an integral part of normal operator duties and retain the properties of valid measurement tasks. This report describes a concept of using realistic radio communications activities as subsidiary workload measurement tasks in R&D simulations and actual flight tests. In order to devise a generalized method of developing communications tasks with controlled levels of added workload which could be tailored to specific system and mission contexts, three methods of workload scaling were applied to 13 communications tasks typical of those occurring in the A-10 aircraft. The first technique provided workload estimates based on the information transmission demands of communications activities. Information theoretical metrics were applied to the perceptual decisions and manual action decisions required in response to incoming messages. In a second scaling effort, this approach was supplemented by estimates of the additional contribution to workload of memory demands, information gathering activities, and instruction complexity, which were not assessed by the information theoretical measures.

AD-834 323/8 PC **A03**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Cross-Cultural Interaction Skill Training. A Field Test of the Self-Confrontation Technique.
Final rept. Mar-Jun 67,
Philip King. Dec 67, 41p Rept no. AMRL-TR-67-206
Distribution limitation now removed.

A field test of the 'self-confrontation' technique for cross-cultural interaction skill training was conducted. Eleven officers, participating in the first course in Psychological Operations and Civic Action in Counterinsurgency (POCA), at the special Air Warfare School, served as subjects. After reading a detailed description of the Iranian culture, they acted in a role-play situation with an Iranian 'Air Force Major.' Following the interaction, subjects reviewed (and heard) their performance via videotape replay, and received a verbal critique of their performance from the experimenter. Subjects then performed in the role play a second time. All subjects without exception improved their performance from the first to the second trial. Participants in the exercise and other observers in the Special Air Warfare School expressed great enthusiasm for the potential of the technique for operational training programs. A guideline for the incorporation of self-confrontation training into operational training programs is given. (Author)

DOE/IR/10144-T1 PC **A02**/MF **A01**
Dayton Univ., OH
Prefreshman and Cooperative Education for Minorities in Engineering: Preface. Final Report, October 20, 1980.
N. C. Cherry. 31 Oct 80, 15p
Contract FG05-79IR10144

The University of Dayton (UD) and Wilberforce University (WU) Preface Program provides a key component in a comprehensive and successful strategy for increasing minority group members and women students entering and graduating in engineering and engineering technology. The high school level includes programs for minority and women students, teachers, and counselors. The University level includes a Dual Degree Program (DDP) between Wilberforce University and the University of Dayton; freshman academic assistance and support programs and schlorships (PREFACE/INSTEP) for the critical freshman year; and,

co-op employment to provide motivation and financial resources for students in upper classes. In the past five years, UD and WU have awarded 89 PREFACE/INSTEP scholarships to students entering UD or DDP and 75 are still in engineering or engineering technology for an outstanding retention rate of 84.27%. Thirty-seven scholarships have been funded by the DOE and its predecessor, the ERDA with a retention rate in engineering and engineering technology of 81.1%. There will be ten PREFACE students graduating in engineering and engineering technology in 1980-1981. The first ERDA Preface Scholar graduated in August 1980 and currently works for a DOE contractor - Monsanto Research Corporation. (ERA citation 06:004000)

HRP-0902695/6 PC **A05**/MF **A01**
Rhode Island Dept. of Health, Providence. Health Planning and Resources Development.
Operative Workloads of Surgeons in Rhode Island, 1970 and 1977.
Technical rept.
Nov 80, 79p TR-22
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

When two area studies from 1970 and 1977 are compared, there appears to have been little movement in Rhode Island toward attainment of most of the recommendations of the Study of Surgical Services in the United States (SOSSUS) regarding an excess of surgical manpower. The 1977 operative work loads of surgeons by specialty were estimated using data collected from the Professional Activity Study data tapes, the American Medical Association's published Masterfile Data, and the Cooperative Health Statistics System's 1977 Physician Relicensure Survey file. Only one operative procedure per discharge with surgery was included in the analysis. A number of manipulations were necessary to produce a data set comparable to the one used in the 1970 SOSSUS for the Rhode Island area. The average surgeon's 'productivity' in 1977 was 92 percent of its 1970 level. Surgeons have increased the number of procedures by an average of 20 percent, although the average complexity of operations they performed has decreased. The researchers performing the 1970 study established an annual work load norm of 3,000 California Relative Value Units per surgeon annually. In 1977, Rhode Island surgeons averaged only 53 percent of that standard. The surgical services provided in Rhode Island in 1977 could have been produced by 42 percent fewer surgeons. Tables, figures, charts, and references are included.

PB81-145054 PC **A02**/MF **A01**
Minnesota Univ., Minneapolis.
Hospital Employees' Wages and Labor Union Organization.
Executive Summary 1 Jun 79-31 Jul 80,
Roger Feldman, and Lung-Fei Lee. 20 Nov 80, 13p NCHSR-81-19
Grant PHS-HS-03649

The research analyzed the joint determination of hospital employees' wages and labor union organization. Two data sources were used: hospital data from a survey of 1,200 U.S. hositals conducted in 1977; and individual data from the 1977 and 1978 Current Population Surveys. Evidence was also presented concerning the spread of hospital unionization following the 1974 amendments of the National Labor Relations Act and the distribution of unionization across different types of hospitals in 1977.

PB81-146821 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia.
The Effects of Employment Location and Scheduling of Work Shifts on Women's Employment Opportunities.
Final rept. Sep 78-Aug 80,
Janice Fanning Madden. Jan 81, 42p DLETA-91-42-78-31-1
Grant DL-91-42-78-31

The study analyzes the effect of workplace-residential separation and demographic characteristics on work schedules of male and female workers from one and two earner households. The household's demand for housing workday leisure, and nonworkday leisure is derived by maximizing household utility as constrained by prices, rent gradients, wages, and unearned income. The model is used to specify the determinants of long run equilibrium change in residential-workplace separation resulting from changes in work schedule.

PB81-150427 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia.
Union Wage and Hours Differentials in the Construction Industry.
Final rept.,
Jeffrey M. Perloff, and Robin C. Sickles. Dec 80, 39p DLETA-91-42-77-33-1
Grant DL-91-42-77-33

In this study of craftsmen in the construction industry, the researchers simultaneously estimated the probability of unionization and wages and hours determination. Our chief findings are that: First, adjusting for simultaneity in a fully interactive specification model increases the estimated union markup in the wage equation. Second, while for prime age craftsmen, hours worked differ little between the union and non-union sector, for others, hours vary greatly. Thus, adjusting for unions' effects on hours worked makes a big difference in the estimated impact of unions on earnings. Third, nonwhites are as likely to be union members as whites, but they earn substantially less than whites in both the union and nonunion sectors, even controlling for personal characteristics and occupation.

PB81-150773 PC **A14**/MF **A01**
Washington Univ., Seattle.
Entrepreneurship Education in 1980,
Karl H. Vesper. Oct 80, 305p NSF/RA-800328
Grant NSF-ISP79-10088
Prepared in cooperation with Babson Center for Entrepreneurship Studies, Wellesley, MA.

Descriptions of courses and experiments in teaching entrepreneurship which have been conducted in 98 schools in the U.S. and Canada are presented. The number of schools now offering such courses is over 147 in the U.S. and 14 in Canada. The monograph, based upon updated surveys from 1969, is intended to facilitate exchange of information among teachers of entrepreneurship courses and those interested in developing such courses. This survey deals with entrepreneurship courses related to the starting of new ventures, whether in business or nonbusiness, and whether as independent enterprises or as new sub-units of larger organizations. Individual course descriptions are listed alphabetically by school and highlight experimentation, outcomes, and new developments. Trends emerging from this study indicate: (1) a need for different types of course design; (2) establishment of whole programs of courses and endowed professorships in entrepreneurship; (3) an uncertain direction of entrepreneurship in engineering schools; and (4) initiation of research on entrepreneurship.

PB81-152126 PC **A06**/MF **A01**
Office of Personnel Management, Washington, DC. Office of Labor-Management Relations.
Digest of Labor Arbitration Awards in the Federal Service. Supplement Number 8.
Oct 80, 115p OPM/OLMR-81/04
See also Supplement No. 7, PB81-125486.

The publication supplements digests of Federal arbitration awards in the LAIRS (Labor Agreement Information Retrieval System) as of Oct. 1, 1980. The cases follow in numerical sequence according to the five-digit record number.

PB81-154890 PC **A04**/MF **A01**
Minimum Wage Study Commission, Washington, DC.
Low Cost Student Labor: The Use and Effects of the Subminimum Wage Provisions for Full-time Students.
Preliminary draft rept.,
Richard B. Freeman, Wayne Gray, and Casey Ichniowski. 15 Jan 81, 64p

The report examines such questions as: what can be learned from the experience with the student subminimum about employer response to reduced wages for special groups of workers; what factors have led some employers to make more extensive use of the student subminimum than do other employers; what, if any, implications can be drawn for a general youth subminimum.

PB81-156416 PC **A05**/MF **A01**
New York State School of Industrial and Labor Relations, Ithaca.
A Microeconomic Analysis of the Effects of Fringe Benefits on Voluntary Labor Mobility.
Final rept. 1 Oct 79-31 Jan 81,
Olivia Stafford Mitchell. 31 Jan 81, 85p DLETA-91-36-79-37-1
Grant DL-91-36-79-37

The study analyzes the effects of fringe benefits on voluntary labor mobility in the United States. The report contains three sections. The first section is theoretical, and analyzes job change responses to fringe benefit structures with special attention to contributory requirements. The second section is empirical, and evaluates the mobility response to several different fringe benefits available through private sector employers. The third section attempts to measure the income loss attributable to non-portable fringe benefits, sustained by workers when they change jobs. The data base is the 1973-77 Quality of Employment Panel Survey developed by the Michigan Institute for Social Research. The results, if confirmed in other data sets, could be used to evaluate the impact of proposed national health insurance and private pension programs on worker mobility patterns.

PB81-159658 PC **A04**/MF **A01**
John F. Kennedy School of Government, Cambridge, MA. Inst. of Politics.
Seminar on Transition and Leadership for Newly-Elected Mayors. Summary Report on Fall, 1979 Program.
May 80, 51p HUD-0001683
Contract HUD-H-2269
Sponsored in part by Sears-Roebuck Foundation, Chicago, IL., and United States Conference of Mayors, Washington, DC.

This summary report reviews and evaluates a 1979 seminar on transition and leadership for newly elected mayors. Of the 15 participants who attended, 8 were from cities of over 100,000 people, and the average population of the participants' cities was 126,000. Two of the mayors had been in office for 6 months, four had already taken office, and nine had not been inaugurated. Of the 15 attendees, 11 came from strong mayoral forms of government. The program was intended primarily to help mayors make the maximum use of the transition period between election and inauguration, as well as during the crucial early months in office. Seminar topics included the mayoral transition process, making appointments, information - gathering and crisis prevention, staffing, and transition problems. Other topics covered effective management techniques, labor relations, finance, police, and intergovernmental relations. Participants viewed the seminar as helpful, particularly in aiding them to prepare for their responsibilities. Topics covering economic and community development and budgeting and finance received the highest ratings. Overall, there is a clear need for this kind of program and for education dealing with such future trends as inflation, the decline of the central cities, unemployment, energy shortages, and more complex management functions. Nine attachments contain seminar information, profiles and geographic distribution of participating cities, and city government functions. Nine attachments contain seminar information, profiles and geographic distribution of participating cities, and city government functions.

PB81-803587 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Human Work Measurement. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 261p
Supersedes PB80-803166, and NTIS/PS-78/1197.

Reports dealing with measurement techniques of human work at jobs and tasks are summarized. Specific topics included are work analysis and evaluation, workload management, operations

analysis, task complexity, and performance measurement. (This updated bibliography contains 254 citations, 43 of which are new entries to the previous edition.)

PB81-858995 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Time and Motion Studies. January, 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Jan 81,
Jan 81, 175p

This bibliography covers information on time and motion studies for more efficient productivity. Topics on flex hours, work rate, work simplification, computer aided motion and time study, and comparisons of performance between robot and human tasks are also included. (Contains 199 citations, fully indexed and including a table of contents.)

5J. Psychology (Individual and Group Behavior)

AD-A093 457/0 PC **A02**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Adjustment and Attitudes of Vietnam Returnees.
Consulting rept.,
Lyle Sussman. Aug 69, 19p Rept no. HUMRRO-E-5344
Contract DAHC19-69-C-0018

This report was prepared to describe the results of a preliminary study of the readjustment problems of Vietnam returnees. Purpose of the study was to establish the general areas of adjustment returnees view as most difficult, and to compare the findings with more detailed studies conducted at the end of World War II. A content analysis of tape-recordings of interviews with enlisted men revealed four major problem categories related to garrison duty; new duty assignment; deference and recognition of combat-zone service; and training new recruits. (Author)

AD-A093 460/4 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
The Recording and Preliminary Analysis of a Data Base for the Assessment of 'Strain' in Air Traffic Controllers, Using Speech.
Technical memo.,
J. B. Peckham. 6 Jun 80, 14p RAE-TM-FS-334, DRIC-BR-75080

A data base of Air Traffic Controllers' verbal communications during periods of high and low activity was tape recorded during the Farnborough International Airshow in 1978. A description of the data base is given together with the activity measures used. The data base was obtained to provide a means of testing the hypothesis that the speech signal can be used to assess 'strain' or the effects of increasing 'stress' in work. Preliminary statistical analysis of the voice 'pitch' of one of the controllers has shown that periods of high and low activity may be readily discriminated using several 20 second segments of voiced speech. (Author)

AD-A093 659/1 PC **A06**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Decision Making Theory and Practice in Command and Control Simulators,
Wayne Carpenter, and James Tripp. Jul 72, 117p
Rept no. HUMRRO-ER-87
Contract DAHC19-73-C-0004

This paper was prepared as background for a study decision-making in military command-and-control situations. It consists of an analytical review of some 600 books and other documents on the subject of decision-making. It discusses (1) the definitions and problems of current (up to 1972) decision theory; (2) the behavioral aspects of decision-making; and (3) the conditions necessary for development of a decision-making model for the Army's Combined Arms Tactical Training Simulator (CATTS). (Author)

AD-A093 838/1 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
A Role Transition Approach to the Stresses of Organizationally Induced Family Role Disruption,
Allan P. Jones, and Mark C. Butler. 1980, 13p
Rept no. NAVHLTHRSCHC-78-34
Pub. in Jnl. of Marriage and the Family, p367-376 May 1980.

No abstract available.

AD-A093 981/9 PC **A11**/MF **A01**
Applied Psychological Services, Inc., Wayne, PA.
Perceptual/Psychomotor Requirements Basic to performance in 35 Air Force Specialties.
Final rept.,
Arthur I. Siegel, Philip J. Federman, and Eugene H. Welsand. Dec 80, 245p AFHRL-TR-80-26
Contract F33615-78-C-0032

A description of the perceptual/psychomotor ability requirements for performing the tasks of various Air Force career fields was sought. To this end, an analysis of the literature relating to taxonomies, measurement considerations, and job analyses was completed to establish appropriate methodologies. This yielded a taxonomy containing 13 perceptual/psychomotor classes along with techniques for collecting the required data. The methods were first tested in two career fields and then, after appropriate revision, were applied in a large scale data acquisition effort which included 35 Air Force career fields. This work included over 800 job incumbents at 10 Air Force bases. High and low perceptual/psychomotor ability requirements were determined for each of 35 Air Force career fields. Indices of profile similarity indicated that the perceptual/psychomotor requirements for most career fields are, in part, unique. A factor analysis of the data indicated that the perceptual/psychomotor ability taxonomy can be described by three factors: visual, auditory, and manual factors. (Author)

PB81-803397 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Intelligence Testing. 1964-February, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Feb 81.
Feb 81, 225p
Supersedes PB80-803851, and NTIS/PS-79/0048.

Reports on the administration of intelligence tests are cited. Test construction, computer-based tests, nonverbal tests, and drug-related results are included, as are methods of adapting standard tests to the special needs of the Armed Forces, the handicapped, the disadvantaged, and ethnic groups. (This updated bibliography contains 217 citations, 13 of which are new entries to the previous edition.)

5K. Sociology

AD-A093 601/3 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Trends in the Socioeconomic Characteristics of Enlisted Navy Accessions Between Fiscal Years 1974 and 1979.
Master's thesis,
David William Luengen. Sep 80, 80p

Socioeconomic representativeness is one of the major equity issues in manpower procurement. The relationship between the military and civilian society was a fundamental question of vital interest to the nation's founding fathers. This has continued to be a concern throughout the following years. Additionally, representativeness as it relates to equality of opportunity has become an increasing social concern. This thesis examines the socioeconomic characteristics of Navy personnel who enlisted during the period between July 1, 1974, and September 31, 1979. The purpose was to determine if any trends in the socioeconomic characteristics were apparent during that period. The socioeconomic characteristics of the fiscal year 1977 Navy enlistees were compared to the U.S. population of 1977. This was done to determine the socioeconomic representativeness of the Navy's enlistees in that year. (Author)

AD-A093 779/7 PC **A03**/MF **A01**
Burt Associates, Inc., Bethesda, MD.
Highlights from the Worldwide Survey of Nonmedical Drug Use and Alcohol Use Among Military Personnel: 1980.
Final Rept.,
Marvin R. Burt, and Mark M. Biegel. 14 Nov 80, 47p
Contract MDA903-79-C-0667
Errata sheet inserted.

This survey report provides a comprehensive, detailed and accurate estimate of the prevalence of drug and alcohol use among the active duty military population as well as information on the physical, social and work-related consequences of drug and alcohol use in the subject population. It was found that abuse correlates generally with: younger age, being unmarried, lower educational attainment, and being male. The drug most commonly used is alcohol followed by cannabis, amphetamines, cocaine, and hallucinogenes. Phencyclidine and heroin were found to be th least used drugs. Nineteen percent of the junior enlisted men reported being high on drugs while working at some time during the previous year while 15% said they have been drunk while working sometime during the year. However, overall and with the exception of cannabis use, drug use in the military population has shown a decline since 1974, the year of the last worldwide survey. (Author)

AD-A093 811/8 PC **A10**/MF **A01**
United States International Univ., San Diego, CA.
The Literature on Military Families, 1980: An Annotated Bibliography.
Interim rept.,
Edna J. Hunter, Donald den Dulk, and John W. Williams. 1 Aug 80, 203p USAFA-TR-80-11
Contracts N00014-79-C-0519, MIPR-79-0042

Significant strides have been made in the area of military family research during the short five-year period from 1975 and 1980. This annotated bibliography on military family literature contains over 400 references and is an update of the 153-item Bibliography contained in the McCubbin, Dahl and Hunter book, Families in the Military System, published in 1976. A number of new topics are addressed in the present bibliography which had received little if any attention in prior years. The majority of these new areas evolved from the shift from the drafttime military to an All Voluntary Force in 1973. Also influential were the changed roles for both women and men in recent years, more dual career families and all-military families, greater number of active duty mothers and single parent families within the military system, and the failure of pay and allowances to meet the severe inflationary pressures of the late 1970s. (Author)

AD-A093 880/3 PC **A15**/MF **A01**
Burt Associates, Inc., Bethesda, MD.
Worldwide Survey of Nonmedical Drug Use and Alcohol Use among Military Personnel: 1980.
Final rept.,
Marvin R. Burt, Mark M. Biegel, Yukiko Carnes, and Edward C. Farley. 14 Nov 80, 349p
Contract MDA903-79-C-0667
See also AD-A093 799.

This survey report provides a comprehensive, detailed and accurate estimate of the prevalence of drug and alcohol use among the active duty military population as well as information on the physical, social and work-related consequences of drug and alcohol use in the subject population. It was found that abuse correlates generally with: (1) younger age, (2) being unmarried, (3) lower educational attainment, and (4) being male. The drug most commonly used is alcohol followed by cannabis, amphetamines, cocaine, and hallucinogens. Phencyclidine and heroin were found to be the least used drugs. Nineteen percent of the junior enlisted men reported being high on drugs while

working at some time during the previous year while 15% said they have been drunk while working sometime during the year. However, overall and with the exception of cannabis use, drug use in the military population has shown a decline since 1974, the year of the last worldwide survey. (Author)

N81-15427/0 PC **A04**/MF **A01**
California Univ., Berkeley. Social Research Group.
Social Issues and Implications of Remote Sensing Applications: Paradigms of Technology Transfer.
Semiannual Status rept.,
I. R. Hoos. 31 Dec 80, 54p NASA-CR-163856
Grant NSG-7522

The transfer of technology from one federal agency to another was observed in the case of the move of LANDSAT to NOAA. An array of unanticipated consequences was found that have important impacts on both the process and outcome of the transfer. When the process was studied from viewpoint of the ultimate recipient, a set of expectations and perceptions were found that figure more in a final assessment than do the attributes of the technology being transfered. The question of how to link a technology with a community of potential users was studied in detail.

PB81-145435 PC **A05**/MF **A01**
Joint Research Team on Housing in Egypt.
Core Housing and Site and Services Projects for Low Income Groups. Seminar Proceedings Held at Cairo, Arab Republic of Egypt on January 29-30, 1979.
1980, 76p TAP-79-6
Text in English and Arabic. Prepared in cooperation with Ministry of Housing, Cairo (Egypt), and Ministry of Development and New Communities, Cairo (Egypt).

The joint Cairo University/Massachusetts Institute of Technology research team on housing, under the auspices and with the cooperation of the Ministry of Housing, and the Ministry of Development and New Communities, held a seminar on 'Core Housing and Site and Services Projects' on January 29-30, 1979, in Cairo, Egypt. This report is a documentation of the projects, papers, and conclusions discussed during the two day period. The study, planning, and design of core housing and site and services projects is now reaching the implementation phase. Several projects are considering this approach on a large scale basis and two of the projects are in the stage of constructing prototypes.

PB81-145989 PC **A13**/MF **A01**
Illinois Univ. at Chicago Circle.
Appalachian Migration: A Review and Assessment of the Research.
Final rept.,
Gary L. Fowler. May 80, 300p
Contract ARC-77-91-5522

The report is a comprehensive review and assessment of studies of Appalachian migration and Appalachian migrants, from 1960 to the present. A comprehensive bibliography of published materials, dissertations, theses and unpublished items is included as well as a list of Appalachian researchers and research centers and current research projects. The review is organized under several topics: total migration, its patterns and selectivity; processes of migration; adjustment patterns of Appalachian migrants in cities; migration to the Appalachian Region, including return migration; and implications of migration research for Commission policies and programs. The author also indicates directions for future research related to Appalachian migration.

PB81-148355 PC **A08**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
An Evaluation of the Housing Assistance Council, Inc.: Revolving Loan Fund Program.
Final rept.,
Gary Ferguson, William Sketchley, and Sherryl Talton. Oct 80, 169p CSA-LN-2629
Contract CSA-B8B-5599

The report is an evaluation of the Revolving Loan Fund Program (RLF) of the Housing Assistance Council, Inc. It is based on visits to nine different organizations with varying characteristics and experience that have borrowed from the fund. The report is presented in two parts. Part I presents the results of a comparative analysis based on site visits to sampled organizations. Chapter 2 provides a brief account of the reason for and history of the revolving loan fund. Chapter 3 summarizes characteristics of the sample borrowers and the contexts in which they operate. Chapter 4 describes the experiences of sample sites with the RLF. Chapter 5 is an assessment of the implications of the information provided by sample sites for use of the fund--including the most noted benefits of HAC financing and technial assistance, changes in HAC's financing strategies and constraints on the loan fund. Chapter 6 presents conclusions and recommendations. Part II consists of a series of case studies prepared for each sample site after completion of field work.

PB81-148405 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
An Evaluation of the Housing Assistance Council, Inc.: Small Town Housing Assistance Project.
Final rept.,
Sherryl Talton. Nov 80, 70p CSA-LN-2630
Contract CSA-B8B-5599

The report is an evaluation of the Small Town Housing Assistance Project (STHAP). The STHAP is a demonstration project to provide technical assistance to small rural communities to deal with rural problems such as inadequate housing, street, water systems, weak economic bases, and the incapacity of local officials or limited town staffs to deal with such problems. The report is presented in five chapters, based on a comparative analyses of the experiences of eight towns in the study. Chapter 2 provides a background for the demonstration by describing pre-existing conditions in towns such as those participating in STHAP. Chapter 3 describes the initiation, objectives and organization of the demonstration, as well as the variety of technical assistance that STHAP has offered to participants. From this description, the need for assistance to small rural communities is underscored. In Chapter 4, the results in sample town are summarized in terms of the three major STHAP objectives. Chapter 5 presents conclusions and recommendations about the program. The study methodology is included.

PB81-149601 PC **A03**/MF **A01**
Boise State Univ., ID. Center for Research, Grants, and Contracts.
Widowhood Over a Five-Year Period: Morale, Interaction, and Role Perceptions,
Carol D. Harvey. Jul 78, 32p
Grant PHS-MH-23496

Although widowhood is common in American society, studies which follow subjects over 5 years are virtually absent. Controls for the length of widowhood and for the occupation of the former spouse are rarely present in research. This report looks at women widowed in the Sunshine Mine fire in Kellogg, Idaho, who were interviewed in 1972 and again in 1977.

PB81-151466 PC **A03**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
The Estimated Effects of the Work Equity Project on Welfare Caseload. Executive Summary.
Interim rept. (Final) Jul 78-Mar 79,
Philip Burstein. Aug 80, 27p AAI-79-141, DLETA-20-25-77-15-7
Contract DL-20-25-77-15

The statistical results showed that WEP was associated with a slight decline in welfare caseload during its first nine months of operation. The decline ranged from 2 percent in the AFDC program to 8 percent for the General Assistance program. None of the coefficients for caseload decline were statistically significant, however.

PB81-151730 PC **A15**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
The Demand for Rental Housing: Evidence from a Percent of Rent Housing Allowance,
Joseph Friedman, and Daniel H. Weinberg. Jun 80, 332p AAI-78-105, HUD-0001770
Contract HUD-H-2040R

The report analyzes the housing consumption of households participating in the Housing Allowance Demand Experiment that received Percent of Rent housing allowances. The Percent of Rent plans offered eligible households rebates equal to some fraction of their gross monthyl rent. Within the Demand Experiment, households were divided into five groups, receiving rebates of 20, 30, 40, 50, or 60 percent of their monthly rent. The percent of Rent rebate reduces the effective price of housing for recipients, thereby creating a distinct incentive for recipients to improve their housing; the percentage rebates offered in the experiment depended only on the experimental plan to which the household was assigned. The analysis described here first estimates an expenditure function that shows how households change their housing expenditures in response to the housing price reductions created by the rebates and how changes in nonexperimental variables, particularly income, affect housing expenditures. It then examines the extent to which changes in housing expenditures due to rent rebates or other factors are likely to be translated into improved housing. It thus provides the basic tools for designing and evaluating alternate rent rebate and income transfer programs.

PB81-151748 PC **A08**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Economic and Racial/Ethnic Concentration in the Housing Allowance Demand Experiment,
Reilly Atkinson, William Hamilton, and Dowell Myers. Jun 80, 170p AAI-79-8, HUD-0001771
Contract HUD-H-2040R

The report examines the effect of experimental housing allowance programs on the residential location of households enrolled in the Housing Allowance Demand Experiment. Specific neighborhood characteristics considered are concentration of low-income and minority residents in the households' census tracts. Changes are also described using other measures of neighborhood quality, such as crime rates and a neighborhood hedonic index.

PB81-151755 PC **A15**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Hedonic Indices as a Measure of Housing Quality,
Sally R. Merrill. Jun 80, 331p AAI-76-96R, HUD-0001772
Contract HUD-H-2040R

The paper develops an important summary measure of housing based on hedonic indices. The analysis of changes in housing is a central issue in the Housing Allowance Demand Experiment. The paper assesses alternative measures of housing and proposes a general measure of housing based on estimated hedonic indices for use in later analysis. There is, however, no generally agreed upon measure of housing and housing quality. Hedonic indices relate rent to measures of housing characteristics and thus provide a way of aggregating the many characteristics into an overall index of quality.

PB81-151763 PC **A06**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Minimum Standards Requirements in the Housing Allowance Demand Experiment,
Helen E. Bakeman, Carol Ann Dalto, and Charles S. White, Jr. Jun 80, 115p AAI-79-16, HUD-0001773
Contract HUD-H-2040R

The report describes the minimum housing standards used in the Housing Allowance Demand Experiment. It describes each component of the physical and occupancy requirements in detail. The report then indicates how often the various elements of the standards caused households to fail the requirements, with special emphasis on those items that accounted for a large proportion of the failures. More than two-thirds of the units at enrollment failed the physical standard.

PB81-151771 PC **A12**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Mobility in the Housing Allowance Demand Experiment,
Jean MacMillan. Jun 80, 275p AAI-78-67, HUD-0001774

Contract HUD-H-2040R

The report, one of a series of technical reports on the results of programs tested in the Housing Allowance Demand Experiment, analyzes the residential mobility of households enrolled in the experiment. The focus of the demand experiment, conducted in Allegheny County, PA. (Pittsburgh), and in Maricopa County, AZ. (Phoenix), is on how low-income renter households use allowances. Four stages of the mobility process are considered: (1) becoming dissatisfied with current housing or neighborhood, (2) planning to move, (3) searching for new housing, and (4) actually moving.

PB81-151797 PC **A22**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Housing Consumption Under a Constrained Income Transfer: Evidence from a Housing Gap Housing Allowance,
Joseph Friedman, and Daniel H. Weinberg. Jun 80, 506p AAI-79-41, HUD-0001787
Contract HUD-H-2040R

The report analyzes the effect of the experimental Housing Gap housing allowances on the housing consumption of recipients, as part of the Housing Allowance Demand Experiment. Under a Housing Gap allowance, eligible households are assisted in obtaining decent housing by a payment designed to make up the gap between the cost of modest, existing, standard housing and the fraction of their incomes which households might devote to housing. Households receive allowance payments only if the housing they rent meet particular housing requirements. Two kinds of housing requirements were tested: Minimum Standards and Minimum Rent requirements. Also, a special 'unconstrained' plan was put into effect whereby households received allowances according to the Housing Gap payment formula but were not required to meet any housing requirements. The Unconstrained plan allows a direct comparison of the Housing Gap plans with a general income transfer program. Finally, a group of control households was not given any housing allowance payment but received a $10 monthly cooperation payment for providing the same information as Experimental households. This analysis concentrates on the effect of the allowance plans on several measures of recipients' housing consumption--housing expenditures, housing services, measures of physical housing adequacy representing a range of policy-oriented standards, and the fraction of income devoted to rent.

PB81-151805 PC **A19**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Participation Under Alternative Housing Allowance Programs: Evidence from the Housing Allowance Demand Experiment,
Stephen D. Kennedy, and Jean MacMillan. Jun 80, 432p AAI-79-120, HUD-0001827
Contract HUD-H-2040R

The report analyzes program participation in the various forms of housing allowance programs tested in the Housing Allowance Demand Experiment. The Demand Experiment tested three major types of housing allowance programs--Housing Gap, Unconstrained, and Percent of Rent--involving about 1,200 Experimental households and 500 Control households in Allegheny County, PA., and Maricopa County, AZ., during 1973-77.

PB81-151813 PC **A16**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Housing Allowances and Other Rental Housing Assistance Programs-A Comparison Based on the Housing Allowance Demand Experiment, Part 2: Costs and Efficiency,
Stephen K. Mayo, Shirley Mansfield, David Warner, and Richard Zwetchkenbaum. Jun 80, 362p AAI-79-111, HUD-0001828
Contract HUD-H-2040R
See also Part 1, PB81-151979.

Part of a series based on results of the Housing Allowance Demand Experiment, this report is one of two that compare Housing Allowances with the major rental housing programs in existence at the time of the Demand Experiment--owned Public Housing, Section 23 leased (existing) Public Housing, and Section 236 with and without Rent Supplements. This report Compares cost of the different programs studied and restricts analysis to one type of Housing Allowance, Housing Gap Minimum Standards, which provides direct cash payments to recipients. The principal analysis is based on costs in 1975. Two aspects of costs are also examined: (1) recent trends in costs of alternative programs to determine how comparative program costs have changed within the recent past and (2) the impact of future inflation and depreciation on present discounted values of costs to determine whether program rankings change when a longer time frame is used for evaluation.

PB81-151821 PC **A10**/MF **A01**
Mathematica Policy Research, Inc., Princeton, NJ.
Survey of Homeowner Experience with New Residential Housing Construction,
Richard L. Kaluzny. Aug 80, 216p HUD-0001796, HUD/PDR-622
Sponsored in part by Federal Trade Commission, Washington, DC.

A national survey of new home buyers was conducted to determine their experience regarding the incidence and repair of problems in their new homes. Data were derived from (1) a telephone survey of 1,812 households that purchased new homes during 1977-78, from 12 to 30 months prior to the survey; and (2) onsite inspections of 299 of the homes whose owners completed the survey. The study focused on all builder-resolved problems and those nonbuilder-resolved problems (i.e. all unresolved and owner-resolved problems) estimated to cost $100 or more to repair. The principal findings can be summarized in terms of three areas of concern: problem incidence, problem cost per household, and owner-builder relations. A total of 62 percent of the households reported having at least one nonbuilder-resolved problem in the 30-month period following closing, with an average repair cost estimated at $1,411, about 8 percent of all homeowners reported repair costs of $2,000 or more for the period. In addition, 22 percent reported having a 'serious disagreement' with the builder with respect to one or more problems; about 7 percent of all homeowners consulted a lawyer in an attempt to resolve the disagreement. Footnotes and tabular data are supplied; data collection and field inspection methodologies are appended along with details on the construction of variables.

PB81-151847 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
How Housing Allowances Affect Housing Markets: Supply Experiment Interim Findings. Housing Assistance Supply Experiment,
Wayne D. Perry. Aug 80, 50p RAND/N-1339-HUD, HUD-0001824
Contract HUD-H-1789

The Housing Assistance Supply Experiment report explores how a housing allowance program affects local housing markets and discusses the factors that explain these observed effects on housing prices, neighborhood change, and market intermediaries. Because of widespread preexperimental conjectures concerning the possible adverse effects that a full-scale program could generate, two north central metropolitan counties, Brown County, Wis., and St. Joseph County, Ind., were chosen for their contrasting market conditions. The housing markets of the counties differed in initial market condition, submarket structure, and housing quality.

PB81-151854 PC **A09**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Evaluation of the Community Economic Development Program: Long-Term Evaluation and Final Report,
Derrin Culp, John S. Tilney, Jr., Peter Finn, Ted Miller, and Wendell J. Knox. 30 Jun 80, 177p AAI-80-62, HUD-0001829
Contract HUD-H-2878

This volume reports on the experience of 10 cities by evaluating their performance under the Community Economic Development Program (CEDP). The program was created on a demonstration basis in the cities to improve their economic development by inducing local officials to coordinate the Federal development funds received. The 10 cities are Philadelphia and Pittsburgh, PA., Baltimore, MD., Chicago, IL., Buffalo, NY., Kansas City, MO., Oakland, CA., Bridgeport, CT., Albuquerque, NM., and Dayton, OH. The report provides a broad overview of the economic predicament of America's older central cities, of the conditions in the CEDP demonstration cities, and of prior Federal and local responses to central city economic decline. Also, the genesis of the CEDP is documented.

PB81-151888 PC **A04**/MF **A01**
Urban Inst., Washington, DC.
Evaluation of FMRs (Fair Market Rents) in the Section 8 New Construction Program: An Application of Hedonic Price Indexes,
Stephen Malpezzi, and Larry Ozanne. Nov 80, 66p URI-1367-3, HUD-0001835
Contract HUD-H-2882

This study compares the New Construction Fair Market Rents (FMR's) schedule with price indexes constructed using Annual Housing Survey (AHS) data to determine whether the FMR's are closely related to market rents. FMR's are rent ceilings for HUD's Section 8 Housing Assistance Program that are set by market area and building type. Price indexes were constructed for new rental housing meeting Section 8 standards and were compared to prevailing FMR's in six large Standard Metropolitan Statistical Areas (SMSA's) to evaluate these rent ceilings. The price indexes were constructed using the technique of hedonic regression, which breaks down housing expenditures into measurable prices and quantities so that rents for identical dwellings in different SMSA's can be predicted. The study found that the hedonic predicted rents were usually lower than the corresponding FMR's but that, in two out of nine cases, the FMR's were less than the hedonic rents. In addition, AHS data confirmed that much private housing could be produced for rents lower than current FMR's. Further, except in very tight markets, the Section 8 Existing Housing Program could provide housing at a lower cost. Finally, the median incomes of inhabitants of new units were not far above the eligibility cutoffs (less than $2,000 more, on average) but were far above those actually in the program (about $9,000 more, on average). Tabular data and footnotes are included. Appendices contain Section 8 standards and hedonic estimation results.

PB81-151896 PC **A02**/MF **A01**
American Planning Association, Chicago, IL.
Local Capital Improvements and Development Management: Executive Summary,
Judith Getzels, and Charles Thurow. Jun 80, 22p HUD-0001845, HUD/PDR-601
Contract HUD-H-2496
See also report dated Jul 77, PB80-135601. Sponsored in part by National Science Foundation, Washington, DC. Research Applied to National Needs.

The executive summary for elected officials, city managers, planning commissioners, and citizens' groups highlights the findings of an extensive study of local government approaches to the use of the capital allocation process as a means of achieving development objectives. The study covered six cities: the three mature cities of St. Paul, Minn., Atlanta, Ga., and Dayton, Ohio, and the three rapidly growing cities of San Jose, Calif., Salem, Oreg., and Aurora, Colo. The mature cities wanted to preserve and rehabilitate existing residential neighborhoods; the rapidly developing cities wanted to control the pace and location of residential development. In both mature and growing cities, elected officials, planners, and budget staff took a number of steps to match their capital expenditures more closely with development objectives.

PB81-151904 PC **A07**/MF **A01**
RAND Corp., Santa Monica, CA.
Rent Inflation in St. Joseph County, Indiana, 1974-78. Housing Assistance Supply Experiment,
David Scott Lindsay, and Ira S. Lowry. Nov 80, 144p RAND/N-1468-HUD, HUD-0001842
Contract HUD-H-1789
See also report dated Sep 77, PB-277 541.

The Experimental Housing Allowance Program bases its payments to participants partly on the marketwide standard cost of adequate housing. The schedule of standard costs has been revised

several times to compensate for inflation. This note's analysis of rent inflation in St. Joseph County, Ind., provides the empirical basis for the fourth such revision since the program began early in 1975. The study was designed to estimate how much gross rents in St. Joseph County changed between November 1974 and July 1978 and to determine whether the program itself contributed significantly to rent inflation.

PB81-151912 PC **A06**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Neighborhood Planning Primer.
Sep 80, 104p HUD-0001843, HUD/NVACP-612

Designed as a resource for neighborhood organizations, the book presents a step-by-step guide to identifying and solving neighborhood problems. The introductory section focuses on possible problem areas (e.g., housing, crime, social services) and offers examples of neighborhood-based solutions. The text explains the need for neighborhood research and lays out the steps for identifying information needs and locating sources of information. The goals, objectives, strategies, and projects which make up the elements of a plan are described, and several examples of neighborhood plans are offered. Advice is given on how to find support for the project, how to get funds, and how to deal with agencies and other potential partners. Focusing on planning tools, the text describes the use of secondary data sources and the collection of primary data, interprets zoning maps and ordinances, discusses the preparation of a neighborhood land use map, and offers outlines of such planning documents as comprehensive neighborhood plans. The final section of the book illustrates successful neighborhood planning through the example of two neighborhood organizations. The case studies document how these groups addressed and solved specific problems and matured from informal planning teams to active, influential organizations. Appendices include 90 references, a list of private sector resources, and a list of funding sources. The book includes numerous photographs, charts, graphs, and other exhibits.

PB81-151920 PC **A07**/MF **A01**
Northeast Ohio Areawide Coordinating Agency, Cleveland.
Guidebook for Using Home Mortgage Disclosure Data for Community Development and Maintenance.
Sep 80, 137p HUD-0001847, HUD/PDR-641
Contract HUD-H-5233

The guidebook for local governments and areawide planning agencies describes techniques and methods for analyzing Home Mortgage Disclosure data. The Home Mortgage Disclosure Act (HMDA) requires Federally regulated financial institutions to disclose annually the number, location, and size of loans made for the purchase and improvement of residential properties. The object of this guidebook is to use HMDA data to produce businesslike analyses and information which support increased involvement by institutional lenders in areas where involvement is currently low or declining. Comprehensive areawide analysis of HMDA data, including relative comparisons, enable institutional market share patterns and degrees of institutional involvement to be documented. The ratio of loans-to-transfers, for instance, is an indicator of residential health and stability in any given area. The first part of the book describes the design, rationale, outcomes, and resources required for preparing such information. The second part contains detailed technical descriptions of the proper tabular format, the highlighting of findings, the inclusion of illustrations and maps, methods for obtaining and preparing data for processing, and the processing of data. Details and examples for several data processing procedures, the methodology for statistical analysis of HMDA data, a list of resource organizations, and a selected bibliography are included. The books uses numerous maps, graphs, and other illustrations to document the procedures.

PB81-151979 PC **A19**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Housing Allowances and Other Rental Housing Assistance Programs-A Comparison Based on the Housing Allowance Demand Experiment, Part 1: Participation, Housing Consumption, Location, and Satisfaction,
Stephen K. Mayo, Shirley Mansfield, David Warner, and Richard Zwetchkenbaum. Jun 80, 427p AAI-79-132, HUD-0001884
Contract HUD-H-2040R
See also Part 2, PB81-151813.

The report is one of a series based on results of the Housing Allowance Demand Experiment. It is one of two reports that compare housing allowances with the major rental housing programs in existence at the time of the Experiment: owned public housing, Section 23=leased (existing) public housing, and Section 236 with and without rent supplements. The data on which the report is based were collected in Allegheny County (Pittsburgh), PA., and Maricopa County (Phoenix), AZ., in 1975.

PB81-156614 PC **A05**/MF **A01**
Colorado Water Resources Research Inst., Fort Collins.
An Empirical Application of a Model for Estimating the Recreation Value of Instream Flow.
Completion rept.,
Richard G. Walsh, Ray K. Ericson, Daniel J. Arosteguy, and Michael P. Hansen. Oct 80, 83p COMPLETION-101, W81-01210, OWRT-A-036-COLO(2)
Contract DI-14-34-0001-8006

The purpose of this study was to develop and apply a procedure to measure the public benefits from cold water river fishing, kayaking, and rafting on the West Slope of the Rocky Mountains, Colorado. Recreation economic benefit functions were related to several important variables, including: instream flow, crowding, characteristics of participants, and costs of management. The information will contribute to an assessment of the economic feasibility of maintaining instream flow to provide recreation opportunities and to protect the natural ecosystem of western rivers.

PB81-169286 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Housing Allowances and Residential Mobility: An Interim Report,
John L. Goodman. Oct 76, 48p HUD-0001275
Contract HUD-H-2162R

The effects of the Experimental Housing Allowance Program on the residential mobility of participants is examined in this interim report, and research in progress and a future data source are described. The Experimental Housing Allowance Program (EHAP) provides a direct cash housing allowance to households for use in obtaining housing that meets the minimum standards of the program. Households may become eligible for the allowance if their existing housing meets minimum standards, if their existing housing is upgraded to meet minimum standards, or if they move to housing that meets minimum standards. EHAP thus has the potential to stimulate residential mobility. Studies of EHAP sites show that moving does play a prominent role in qualifying for assistance even though there is considerable variation across sites regarding the percentage of eligibles who move to qualify. When comparisons of the mobility patterns of EHAP eligibles are made with those of a control group and the preprogram mobility patterns of participants, evidence shows that EHAP affects the timing of moves without drastically altering the probability of moving over the period of about a year. Despite the frequency of census tract switching by movers in the EHAP, there is no evidence that the program in its first year has altered the central city or suburban distribution of participating households. Further research stimulated by EHAP concerns mobility or housing consumption interrelationships, housing search behavior, and preferences, satisfaction, objective housing characteristics, and mobility. Progress is being made toward getting all of the data from EHAP into suitable form for general use. The appendix provides background and a description of the EHAP. Tabular and graphic data are provided.

PB81-169310 PC **A05**/MF **A01**
Urban Inst., Washington, DC.
Experimental Testing of Housing Allowances: Evidence of Program Feasibility and Other Preliminary Findings.
James P. Zais, John D. Heinberg, and Margaret J. Drury. Feb 76, 87p HUD-0001402
Contract HUD-H-2162R

Based on approximately 2.5 years of testing, this report discusses what has been learned through the early experience of the Experimental Housing Allowance Program (EHAP). Two major areas are covered: (1) evidence concerning the basic feasibility of the housing allowance approach as a way of assisting low - income households, and (2) the status of continuing EHAP research, including some preliminary findings. The report contains early indications of patterns that are emerging from a very complicated data base and is in no way a final statement. Congress authorized HUD, under sections 501 and 504 of the Housing Act of 1970, to establish an experimental program to test the concept of housing allowances involving direct cash assistance to lower - income households to upgrade housing. Twelve sites, representing broad geographic, economic, and demographic diversity, were selected for operation of the program on an experimental basis. EHAP had three components, the Demand Experiment, the Supply Experiment, and the Administrative Agency Experiment. Findings from these site experiments show that the program appears able to attract large numbers of applicants within a short period of time. Most program enrollees have been able to cope in the market and to occupy housing meeting program requirements. Overall, the basic administrative arrangements of an allowance program are feasible, and housing allowances have been well received in the 10 communities where a significant awareness of the program exists. Early findings show that recipients were able to reduce excess housing cost burdens and that few fundamental changes in mobility rates or locational patterns occurred. The program did not generate higher prices in the housing market. Certification of participants' income rather than accepting statements on income level at application resulted in substantial savings. A map, table, footnotes, and a bibliography are included. Information on the background and description of EHAP and current status of EHAP are appended. (Author abstract modified).

PB81-169328 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Explaining Household Response Differences: Some Preliminary Considerations,
James P. Zais. 20 May 75, 31p HUD-0001403
Contract HUD-H-2162R

This paper, which concludes a series of reports on early work in the Integrated Analysis of the Experimental Housing Allowance Program (EHAP), proposes a list of variables that could help to explain differences in participating households' responses to the program. The Integrated Analysis explains certain household response differences from three experiments, the Administrative Agency Experiment, the Supply Experiment, and the Demand Experiment. The paper begins with an examination of the extent to which 'treatment' elements can be used to explain response differences within the Integrated Analysis and an attempt to place this problem within the general framework explaining response variation. These treatment variables include those that are descriptive of the households themselves (race, income, household size, etc.) and those that are descriptive of the EHAP experience that the households undergo. The latter set includes both the various experimental procedures that affect EHAP households as well as the housing allowance program itself. These variables are (1) experimental elements (key definitions in payment formulas, estimates of parameter values, form of earmarking, nonmonetary assistance, administrative mechanism, and scale of program) and the (2) site characteristics (general, economic, demographic, and housing). Examination of these treatment variables should determine whether EHAP actually makes a difference in terms of household responses. Rival hypotheses offering alternative explanations of why households behave as they do in EHAP are historical events that enter into experimental situations (such as New Jersey's extension of welfare benefits to unemployed parents in March 1969) and maturation or adjustment of the households to the allowance and to their new consumption patterns. Others are

effects of testing which might cause change in household behavior, variations in the administration of the test instrument, and selection, mortality, and interaction effects -- recruitment and dropout of participants. A final variable is data error, assumed to be randomly distributed. Sorting out these confounding extraneous effects requires continuous, ongoing investigation of data and should be part of an analysis seeking to explain household response variation.

PB81-169336 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Housing Allowances and Existing Housing Regulations,
Morton L. Isler, and Robert E. Agus. Jan 75, 50p HUD-0001405
Contract HUD-H-2162R

This report is concerned with the potential interaction between Direct Cash Assistance for Housing (DCA) and the State and local regulation of the supply of housing services. It considers how the design of DCA might take existing State and local regulation into account. The report begins by postulating the shared and unshared goals of DCA and codes involved in regulation (i.e., housing, health, fire, and building codes). It then identifies current conditions of State and local regulation and the likely impact of DCA on existing regulation, as well as that of existing regulation on DCA. It outlines options for interrelating DCA and code enforcement. The report suggests that national objectives be established for the quality of housing occupied by DCA recipients, but that State and local codes be relied on for specific standards. Because code administration is as important as code standards, the report suggests directions for Federal Government evaluation of the quality of housing of DCA recipients. If housing quality objectives of DCA are not being met, the report suggests that Federal housing standards for DCA recipients could be imposed on the community as a last resort. Also recommended is a further examination of the emerging 'covenants of habitability' between landlords and tenants. Footnotes and a chart are included. A discussion on State involvement in housing regulation, an example of national housing quality objectives, and related legislation are appended. (Author abstract modified).

PB81-169344 PC **A04**/MF **A01**
Urban Inst., Washington, DC.
Simulations of Housing Allowance Policies for U.S. Cities: 1960-70,
Larry Ozanne. 17 Jul 75, 67p HUD-0001407
Contract HUD-H-2162R

A simulation model of urban housing markets has been under development at the Urban Institute since 1971. Recently the model has been calibrated for six U.S. standard metropolitan statistical areas for the 1960 to 1970 decade. This paper reports on the results of simulating a set of housing allowance policies in the 'cities.' The allowance policies cluster around those currently receiving consideration by policymakers. A full - scale housing allowance program has a negligible effect on the price of housing marketwide in these simulations, but in some cities it does have a noticeable effect on prices at the bottom third of the market. Reducing the scale of the program reduces the inflationary impact, whether that reduction comes from an across the board lowering of average subsidies or from the categorical exclusion of certain household types from eligibility. The success with which allowance payments are earmarked to housing consumption under the housing gap formula depends critically on how close the cost of the imposed housing standard is to the payment standard in the formula. If the housing standard costs much more than the amount the formula is geared to subsidizing, very few eligible households participate in the program. Alternatively, if the allowance is geared to paying considerably more than it costs to meet the housing standard, most eligible households participate, but there is a sharp increase in the rate at which allowances 'leak' to nonhousing purchases. In the latter case, in which the allowance is geared to pay more than the cost of meeting the housing standard, the addition of a 'percent - of - rent' earmarking considerably reduces the leakage. However, addition of the 'percent - of - rent' earmarking does not achieve as high a rate of expenditure on housing as a careful matching of the cost of meeting the housing standard and the payment standard. Footnotes, graphs, and tabular data are provided.

PB81-169351 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Causes and Indicators of Housing Quality,
John L. Goodman. Dec 76, 30p HUD-0001408
Contract HUD-H-2162R

The measurement of housing quality is a major focus of the Integrated Analysis of the Experimental Housing Allowance Program (EHAP). This paper examines the feasibility and validity of one method for combining measures of different dimensions of the quality of a household's housing situation into a summary index value. If such a valid index could be devised, it would facilitate the evaluation of changes in participants' housing in EHAP. Alternative mathematical models are specified, and their parameters are estimated using data on the preexperimental housing of participant households at the Pittsburgh, Pa., site of the Demand Experiment. Adapting the approach of housing demand studies, the models assume that the causes or determinants of a household's quality are the household's income, size, and the education and race of the household head. The quality of a family's housing situation is treated as an unobservable variable -- an abstract theoretical construct -- for which there are multiple observable indicators (percent of income spent on rent, persons per hundred square feet of floor space, and a derived measure of the market value of the household's dwelling unit and neighborhood). The concept of housing quality has no simple counterpart in the preference of households. The three examined indicators cannot be combined into a single variable expressed as the object of consumer's housing demand. The validation for any single housing quality measure and its calibration must be established according to some criterion other than a convenient, population - determined set of weights. Tables, figures, and footnotes are included. The statistical properties of the model used in the paper are appended. (Author abstract modified).

PB81-169369 PC **A04**/MF **A01**
Urban Inst., Washington, DC.
Measuring and Interpreting Housing Change in the Experimental Housing Allowance Program,
John L. Goodman. Mar 78, 72p HUD-0001409
Contract HUD-H-2162R

The Experimental Housing Allowance Program (EHAP) is intended to answer an extensive list of policy questions. Two of these questions -- how much do recipients of housing allowances improve the quality of their housing, and how do the locational choices of households receiving housing allowances compare with existing residential patterns -- are the focus of this report. Methodological issues faced in deriving information from EHAP that can be applied to policy formation are emphasized. The report is an interim product of EHAP's Integrated Analysis. The housing outcome measures being examined in one or more of the three EHAP experiments and in the Integrated Analysis are rent, 'hedonic indexes' of housing quality, attainment of individual housing and neighborhood features, attainment of housing that meets housing program requirements, crowding, participants' housing satisfaction, and housing cost burden. The strengths and weaknesses of the Integrated Analysis in large measure are those of the three experiments -- the Demand Experiment, the Administrative Agency Experiment, and the Supply Experiment. Based on information from all three experiments, the Integrated Analysis is attempting to construct a mosaic of what could be expected to happen to participants' housing under any one of a variety of programs operating nationally. Although evidence is not conclusive at present, data show that allowance recipients as a group have made no major changes in their location patterns or neighborhood quality in response to the allowance program. Footnotes, tables, and references are included. (Author abstract modified).

PB81-169377 PC **A99**/MF **A01**
Department of Housing and Urban Development, Washington, DC.
Housing Systems Proposals for Operation Breakthrough.
Dec 70, 602p HUD-0001494

This compilation of housing systems proposals presents the technical descriptions of proposals submitted in response to a request for proposals by Operation Breakthrough. The program was initiated with invitations to local governments and private citizens and organizations for response in the areas of prototype sites, site planners, site developers, and housing systems producers. Efforts were made in each invitation to encourage quality levels above those adopted as minimal and to obtain a maximum number of responses to assure the greatest competition. A total of 224 Type A proposals that dealt with design, testing, and evaluation of complete housing systems were received by HUD. The 388 Type B proposals received dealt with both 'hardware' and 'software' concepts of housing. They required further design and development before being reduced to practice. A total of 423 proposals were released for publication and are reported here. The text presents a very brief abstract of the major concepts set forth in each proposal, while charts and illustrations provide a summary of pertinent data and characteristics. Generic terms have been substituted for trade and proprietary names. The chart accompanying each proposal abstract provides a concise description of phases of the total housing process. Related materials in the appendices include an alphabetical index of housing, prototype site proposals, and prototype site design. Footnotes and 19 references are given.

PB81-169385 PC **A06**/MF **A01**
Peat, Marwick, Mitchell and Co., Washington, DC.
Dover Estates Property Disposition Demonstration: Property Disposition Demonstration Data Gathering, Analysis, and Evaluation Program. Final Evaluation.
30 Sep 78, 124p HUD-0001530

This report summarizes a third - party evaluator's assessment of the Dover Estates demonstration in Mich., one of several innovative property disposition efforts in progress around the country. Dover Estates aimed at efficiently solving HUD's problem of a growing inventory of vacant blight - causing properties in urban and suburban areas. The Dover Estates project, implemented jointly by HUD, the city of Taylor, Mich., and a special - purpose organization called the Neighborhood Development Commission, was designed to aid subdivisions that have a high percentage of abandoned and foreclosed properties. The approach can be used when traditional methods of disposition have proved unsatisfactory in reducing HUD's inventory, in minimizing losses to the HUD insurance fund, and in stemming further default, abandonment, and blight. In essence, the Dover Estates approach resorted to renting fully repaired, formerly abandoned HUD properties prior to their eventual sale. By restoring units to like - new condition, adding above - standard amenities, and renting the units to higher - income occupants, the project facilitated the beginning of neighborhood stabilization. The evaluation report provides a description of the troubled subdivision and conditions which led to the implementation of the demonstration concept. The impact analysis of the program - implementation phase reports on property transactions, compares real estate activity in the subdivision with that of the city, and provides a cost - benefit and a socioeconomic analysis. Internal project components are discussed, the treatment emphasizing the role played by management at all levels in achieving the demonstration's purpose. In conclusion, the report assesses the general applicability of this approach and identifies some obstacles encountered by this project that could be avoided by similar efforts in the future. A series of appendices describe the methodologies used for analyzing project components and provides documentation for specific events in the history of the program. Tabular data and graphs are included.

PB81-169450 PC **A14**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.

Structure, Operation, Performance, and Development Trends of the Mobile Home Industry. Volume I. The Building Industry Tomorrow: The Case of the Mobile Home Industry,
Arthur D. Bernhardt, Susan A. Camardo, Jonathan Hale, Phyllis Quigley, and Maria Wojtowicz. 15 Jul 76, 306p HUD-0001553
Contract HUD-H-1682

First of a five - volume series on the structure, operation, performance, and development trends of the mobile home industry, this report presents an overview of the mobile home industry and predictions about the industry's future development. A general strategy is proposed for improving the performance of the entire building sector. This strategy was established by the Project Mobile Home Industry (PMHI) of the Massachusetts Institute of Technology. Phase I of the project is a comprehensive analysis and evaluation of the present state and emerging trends of the mobile home industry, including the industry's supporting and regulatory environments. Phase II is an analysis of the industry to determine in what ways, to what extent, and at what rate the industry could improve its performance. Phase II contains individual measures for improving social and economic performance of the industry. These measures are developed in three ways: (1) further nurturing of existing factors and emerging trends found to have an influence on social and economic performance, (2) improvement and adaptation of existing programs and proposals for improving the performance of other building industries, and (3) invention of new measures based on an inductive examination of Phase I analysis of the existing industry and its environments. Tables, charts, diagrams, and illustrations are included.

PB81-169500 PC **A99**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Household Survey, Site II, Wave 3. Housing Assistance Supply Experiment,
Patricia Boren. May 80, 915p RAND/N-1359-HUD, HUD-0001571
Contract HUD-H-1789
See also HUD-0001637.

This codebook is one of a series documenting survey materials used in the Housing Assistance Supply Experiment (HASE). HASE monitors the effects of experimental housing allowance programs operating in two midwestern housing markets by regularly surveying a marketwide sample of about 2,000 residential properties in each site. The codebook describes the data collected in the third (wave 3) household survey (the survey of tenants and homeowners) conducted in St. Joseph County, Indiana, Site II of the experiment. For each question in the survey instrument, the codebook reproduces the exact text, specifies all permissible responses, and provides a tabulation of the unweighted responses recorded in the preliminary master file of survey records. Where applicable, individual questions are annotated with instructions to the survey staff that affect the interpretation of responses. The quality of the survey data is addressed in the overall audit of the wave 3 household survey, published separately. Three appendices contain St. Joseph County neighborhoods, a glossary, and audit codes. (Author abstract modified).

PB81-169518 PC **A04**/MF **A01**
Leadership Council for Metropolitan Open Communites, Chicago, IL.
Lawyers Revolving Fund Manual, Title VIII.
23 May 78, 75p HUD-0001609
Contract HUD-H-2519

This manual provides a description of the Lawyers Revolving Fund and information, including forms and procedures, for the establishment of such a program. It is intended for use by local bar associations, private fair housing groups, and State and local public agencies concerned with fair housing, who may wish to add the private suit method of fair housing enforcement, or to expand existing capabilities of fair housing strategies. The fund was established to encourage the participation of the private bar in open housing litigation as part of a regular legal practice. Under the HUD demonstration contract, the fund established a panel of attorneys to take fair housing cases; provided training for them; and established and carried out procedures for accepting, investigating, and referring cases. An initial retainer was provided, to be repaid from any recovery in the case. The program was approved by a recognized bar association and operated as an open panel referral service. During the 1 1 / 2 years of operation, 37 Federal district court cases have been prosecuted under the fund arrangements. Procedures for establishing a fund include defining specific goals and structure, obtaining necessary support and financing, and obtaining the approval of the organized bar. Operation methods, staff requirements and training, and composition of the referral panel are also detailed. Standards for operating the fund cover the lawyers' agreements, complaint intakes, investigations, and general counsel review. The forms and procedures necessary for optimal administrative functioning are explained and appended. Fourteen references are also provided. (Author abstract modified).

PB81-169526 PC **A04**/MF **A01**
Stanford Univ., CA. Stanford Mid-Peninsula Urban Coalition.
Establishing and Operating a Comprehensive Fair Housing Enforcement Program. A Guide to the Investigation and Trial of Housing Discrimination Cases. Descriptive Manual,
W. James Ware, and Eric Wright. Jun 80, 66p HUD-0001610
Contract HUD-H-2279

This manual is a step - by - step guide to the establishment of a community fair housing program to serve the interests of minority persons who experience discriminatory housing practices. Community groups must establish such organizations to supplement HUD regional offices, which are insufficient in number and staff to handle individual cases arising every day and requiring immediate investigation. The manual identifies types of groups suited to organize fair housing enforcement programs (local government representatives, human relations committees, churches, consumer advocate groups, universities, the local Bar, etc.); outlines nonprofit incorporation matters; and makes suggestions for deciding on target areas, telephone codes, and publicity approaches. Public announcements are especially important to prompt immediate client response. To deal with complaints of suspected discrimination, investigators must serve the interests of all races and be recruited from all parts of the area; they must be trained to rule out all factors except race, religion, or sex as the reason for the caller's rejection. If the investigation indicates illegal discrimination, the case is referred to an attorney; using volunteer attorneys with interests in civil rights issues is recommended. Funding sources and methods of obtaining funding are discussed, and it is urged that groups beginning their organizational effort in fair housing enforcement enlist the services of a consulting attorney. Various aspects of an operational organization are detailed, including case intake, staff training and recruitment, the assignment of appropriate investigators to specific cases, investigative procedures, and attorney selection and preparation for involvement with fair housing cases. An outline for presentation of a case in court is included, with emphasis on witness testimony and examination of managers and owners at trial. The organization's recordkeeping is also explained. Tables and charts are provided.

PB81-169534 PC **A07**/MF **A01**
RAND Corp., Santa Monica, CA.
Supplemental Codebook for the Survey of Residential Buildings, Site II, Wave 3. Housing Assistance Supply Experiment,
Patricia Boren. Jun 80, 140p RAND/N-1394-HUD, HUD-0001631
Contract HUD-H-1789

This codebook provides reference data on characteristics of 172 residential rental buildings surveyed in St. Joseph County, Indiana from September through November 1977. This sample was intended to supplement data collected in the Housing Assistance Supply Experiment (HASE) which surveys a large sample of residential properties throughout the country on a regular basis. The smaller, or wave 3, survey concerned a portion of the buildings in the HASE sample and based its responses on extensive observations of the physical characteristics of the buildings, as well as on the general neighborhood environment. The format used to describe variables and provide response frequencies is outlined and illustrated. The definition of each variable is followed by its input variables and a description of its construction. Marginal tables provide additional information on the file by showing the incidence of nonresponse, highlighting extreme values, and indicating cumulative distributions of response values. Examples of building characteristics treated in the codebook are exterior walls, landscaping, roofs, sidewalks, chimneys, and mailboxes. Audit codes are appended, and an index of variables is provided.

PB81-169542 PC **A06**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Attitude Module of the Household Survey, Site II, Wave 3. Housing Assistance Supply Experiment,
Patricia Boren. Jun 80, 116p RAND/N-1371-HUD, HUD-0001633
Contract HUD-H-1789

This codebook, one of a series documenting survey materials used in the Housing Assistance Supply Experiment, describes the data on community attitudes collected in the third (wave 3) survey of tenants and homeowners conducted in St. Joseph County from January to July 1977. Procedures for coding the open - ended responses, cleaning the data, auditing, and developing the final file are described. The organization of the codebook is explained in detail, with each question from the attitude survey reproduced as it appeared in the questionnaire. Response frequencies are provided in tables of marginals, and information bearing on the interpretation of the questions or responses appears below the box containing the question. The data on response frequencies include audit codes, highlight extreme values, and provide cumulative distributions of response values. Audit codes are appended.

PB81-169559 PC **A13**/MF **A01**
RAND Corp., Santa Monica, CA.
Supplemental Codebook for the Survey of Landlords, Site II, Wave 3. Housing Assistance Supply Experiment,
Patricia Boren, and Kenneth Wong. Jul 80, 277p RAND/N-1387-HUD, HUD-0001636
Contract HUD-H-1789

This codebook provides additional data on landlords' characteristics and attitudes which are based on variables derived from the Housing Assistance Supply Experiment third (Wave 3) survey of owners of residential properties in St. Joseph County, Indiana. From April through August 1977, this survey questioned owners about their real estate activities, investment opportunities, management policies, financial operations, and attitudes toward the allowance program. The procedures followed in constructing the data base are described. For each variable, the codebook details the construction, specifies all permissible responses, and provides a tabulation of the unweighted responses recorded in the final master file which contains 3,698 records. The table of marginals given for each variable includes audit codes, highlights any extreme values, and shows cumulative distribution of response values. Examples of variables are percent of income from real estate holdings, insurance premiums, fuel usage, costs of legal services, tenant repairs, and evictions. The appendix contains the survey audit codes and the algorithms used to calculate landlord debt and utility expenses of tenants. A glossary and an index of variables are included.

PB81-169567 PC **A23**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Landlords, Site II, Wave 3. Housing Assistance Supply Experiment,
Patricia Boren. Jun 80, 535p RAND/N-1352-HUD, HUD-0001639
Contract HUD-H-1789

This codebook describes data collected in the third (wave 3) survey of landlords conducted in St. Joseph County, Ind., site II of the Housing Assistance Supply Experiment, from April through August 1977. For each question in the survey instrument, the codebook reproduces the exact text, specifies all permissible responses, and provides a

tabulation of the unweighted responses recorded in the preliminary master file of survey records. Where applicable, individual questions are annotated with instructions to the survey staff that affect response interpretations. Extreme values in the data are highlighted to indicate a need for special analysis to validate the data or explain abnormal distributions. The cumulative distributions of response values enable the user to calculate measures of central tendency and dispersion, such as the median and interquartile range. Footnotes are included. An information sheet, glossary, and audit codes are appended. (Author abstract modified).

PB81-169575 PC **A07**/MF **A01**
Houston Office of the Mayor, TX. Planning Coordination Div.
Transferable Housing Planning Technology. Framing Growth Options: Required Employment, Population and Household Projection Routines.
Jan 79, 133p HUD-0001665
Contract HUD-H-2658

Efforts by the city of Houston, Tex., to develop transferable methodologies for framing and evaluating urban growth options are described. The report provides an overview of the HUD contract supporting the city's efforts; a review of the emerging growth planning methodology as currently envisioned; a review of the population module of the growth planning methodology, including its computer applications; and a summary of the assumptions currently established by the city pertaining to population and household growth between the years 1970 and 2000. The adequacy of the methodology selected for projecting population and households will not become evident until the total growth option methodology is implemented. Because the city has not yet developed net in - migrant estimates or characteristics, the development of a methodology for directly relating net in - migrant population to another set of variables is not possible. Therefore, the methodology of estimating total population as a function of employment and estimating net in - migrants as a residual between total population and estimated net natural growth seems to be the best alternative. Tables, eight references, and several maps are included. Appendices present employment figures for Harris County (1975 - 1995) and the demographic planning survey.

PB81-169583 PC **A09**/MF **A01**
Houston Office of the Mayor, TX. Planning Coordination Div.
Transferable Housing Planning Technology. Working Paper: Description of a Methodology for Expressing Growth Options for the City of Houston, Texas.
Aug 79, 197p HUD-0001666
Contract HUD-H-2658

This paper is one of a series of papers describing the efforts of the city of Houston, Tex., to develop methodologies for expressing and evaluating growth options for the city. The report provides an overview to the HUD contract supporting the effort; a review of the methodology being used to express growth options; and a review of the use of the growth option methodology to express two growth options to the city through the year 2000. The objectives are evaluated in terms of their impact on various sectors of the housing market and on the capital and operating costs of the city. The methodology for expressing growth options uses the following modules: population and household, locational preference, census tract share, unit forecast, and tract level household and population. A review of growth planning calculations presents 62 interrelated calculation steps. They describe the purpose, general approach to performance, required assumptions, and any special features of its computerization. Test results of the Housing Calculation Tool are given. Results indicated that the tool required a large number of user - supplied assumptions and a sound initial data base. Data provided by the tool were generally more extensive and more defensible than those derived from any other source. The forecast results of the inner city growth option are appended, as are statistical data and pertinent 1980 Census data. Additional tabular data and maps are provided. (Author abstract modified).

PB81-169591 PC **A05**/MF **A01**
Houston Office of the Mayor, TX. Planning Coordination Div.
Transferable Housing Planning Technology. Working Paper: Description of a Methodology for Evaluating Housing Market Impact of Growth Options for the City of Houston.
Aug 79, 99p HUD-0001667
Contract HUD-H-2658

This paper is one of a series of papers describing the efforts of the city of Houston, Tex., to develop methodologies for expressing and evaluating growth options for the city. Specifically, this paper discusses the methodology for expressing growth options and the use of the Housing Calculation Tool to test the impact of growth options on the housing market. The report also provides an overview to the HUD contract supporting this effort; a review of the methodology for evaluating housing market impact; and a review of the use of the housing market evaluation methodology in preparation of the 1980 Housing Assistance Plan. Briefly, the Housing Market Evaluation methodology is reviewed in terms of requirements, selected methodology, evaluation process, and evaluation process review. Eleven major steps are used in the evaluation methodology to assess housing market impact of any particular growth forecast. They include selecting the time period, geographic area, type of household and unit forecast, and establishing initial household preferences for units by type. Population, household, and unit forecasts used in estimating needs for assisted housing, assumptions used to generate population, household, and unit forecasts, and estimates of 1980 needs for assisted housing are appended, as is a map of the study area. (Author abstract modified).

PB81-169609 PC **A06**/MF **A01**
Houston Office of the Mayor, TX. Planning Coordination Div.
Transferable Housing Planning Technology. Housing Calculation Tool: Users' Manual.
Aug 79, 105p HUD-0001668
Contract HUD-H-2658

This manual is the result of an overall effort by the city of Houston, Tex., to explore various growth options for the city and the impact of such options on the housing market and requirements for city services. The key to the development and testing of growth options is the creation of various analytic tools. One such tool is the Housing Calculation Tool, a series of interrelated computer programs which generate data on city housing population and household characteristics. User procedures have been developed to facilitate use of the housing tool, allowing the operation of computer programs with a minimum of background and experience. English language prompts of instructions have been developed and placed in the computer. These prompts are a series of steps which guide the user through processes of (1) assumption setting; (2) execution of various modules of the tool; and (3) preparation of summary reports of the output of the various computer modules. To assist potential users, this manual describes the computer - based instructions and their application. The manual also provides an overview of the HUD contract supporting the development of the housing tool; a review of the emerging growth planning methodology which the housing tool is designed to support; and a users' guide on housing tool operation. (Author abstract modified).

PB81-169617 PC **A04**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Community Planning and Development.
Citizen Participation in the Community Development Block Grant Program. A Guidebook.
Dec 78, 65p HUD/CPD-389, HUD-0001673

This guidebook provides explanatory materials about the 1978 citizen participation requirements of the Community Development Block Grant (CDBG) Program for HUD personnel, local government staffs, and interested citizens. Beginning with an overview of the role of citizen involvement in community development, the guide describes the geographic scale of areas targeted for citizen participation, and identifies groups that must be included when forming advisory committees or during other processes. The importance of communication between public officials and citizens is emphasized in a discussion of disclosure and access standards for all records, publication of information and notices, public hearings, and community meetings. To fulfill the HUD requirement that citizen participation be continuous throughout all phases of a CDBG program, the roles of citizens' groups in the grant application, the operations of the actual project, and the final evaluation are detailed. Types of technical assistance that can be obtained by community organizations and procedures regarding citizen complaints about the program are also considered. Separate chapters cover citizen participation requirements for the small cities program and Urban Development Action Grants. The text of the HUD regulations on citizen participation in CDBG is appended and contains references to the guidebook that explain particular rules. A list of HUD area offices is provided.

PB81-169666 PC **A22**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Landlords, Site II, Wave 4. Housing Assistance Supply Experiment,
Patricia Boren, and Deborah Wesley. Jul 80, 524p RAND/N-1353-HUD, HUD-0001684
Contract HUD-H-1789

This codebook is one of a series documenting survey materials used in the Housing Assistance Supply Experiment (HASE). HASE monitors the effects of experimental housing allowance programs operating in two midwestern housing markets by regularly surveying a marketwide sample of about 2,000 residential properties in each site. The codebook describes the data collected in the final (wave 4) survey of landlords conducted in St. Joseph County, Ind., Site II of the experiment. For each question in the survey instrument, the codebook reproduces the exact text, specifies all permissible responses, and provides a tabulation of the unweighted responses recorded in the preliminary master file of survey records. Where applicable, individual questions are annotated with instructions to the survey staff that affect the interpretation of responses. The quality of the survey data is addressed in the overall audit of the wave 4 landlord survey, published separately. Appendices contain a landlord information sheet, a glossary, and audit codes. (Author abstract modified).

PB81-169674 PC **A11**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Residential Buildings, Site II, Wave 3. Housing Assistance Supply Experiment,
Patricia Boren. Jul 80, 239p RAND/N-1356-HUD, HUD-0001687
Contract HUD-H-1789

This codebook is one of a series documenting survey materials used in the Housing Assistance Supply Experiment (HASE). It describes the data collected in the third (wave 3) survey of residential buildings conducted in St. Joseph County, Ind., Site II of the experiment. Whereas the first survey was addressed to a large sample of residential buildings throughout the county, the wave 2 and wave 3 surveys were designed merely to supplement information gathered at the baseline. The codebook describes records for only 172 properties either not included in the baseline sample or improperly surveyed. It serves as a basic reference document that enables data users to interpret the responses to nearly 400 questions and to help them plan tabulations or other analyses. For each question in the survey instrument, the codebook reproduces the exact text, specifies all permissible responses, and provides a tabulation of the unweighted responses recorded in the preliminary master file of survey records. Where applicable, individual questions are annotated with instructions to the survey staff that affect the interpretation of responses. Tables and footnotes are included. Appendices include reference photos, a glossary, audit codes, and a survey of residential buildings information sheet. (Author abstract modified).

PB81-169682 PC **A08**/MF **A01**
RAND Corp., Santa Monica, CA.

Supplemental Codebook for the Survey of Residential Buildings, Site II, Wave 4. Housing Assistance Supply Experiment,
Patricia Boren. Aug 80, 155p RAND/N-1395-HUD, HUD-0001688
Contract HUD-H-1789

Variables derived from data collected in the final (wave 4) survey of residential buildings conducted in St. Joseph County, Ind., Site II of the Housing Assistance Supply Experiment (HASE), from August through November 1978, are described in this codebook. Derived variables consist of recodes, aggregations, and other transformations of original responses; data collected in a related survey or found in another data base pertaining to the same property or dwelling; and sample - selection indicators. For each derived variable, the codebook details the construction, specifies all permissible responses, and provides a tabulation of the unweighted responses recorded in the final master file of survey records. Extreme values are highlighted so a need for special analysis to verify the data or explain abnormal distributions is indicated. The cumulative distributions of response values enable the user to calculate measures of central tendency and dispersion, such as the median and interquartile range. A glossary of terms is included, and audit codes and an index of variables are appended.

PB81-169690 PC **A99**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Household Survey, Site II, Wave 4. Housing Assistance Supply Experiment,
Patricia Boren, and Deborah Wesley. Jul 80, 901p RAND/N-1360-HUD, HUD-0001689
Contract HUD-H-1789

This codebook describes data collected in the final (wave 4) household survey conducted in St. Joseph County, Ind., site II of the Housing Assistance Supply Experiment. The survey of tenants and homeowners was carried out from February through August 1978. For each question in the survey instrument, the codebook reproduces the exact text, specifies all permissible responses, and provides a tabulation of the unweighted responses recorded in the preliminary master file of survey records. Where applicable, individual questions are annotated with instructions to the survey staff that affect the interpretation of responses. Extreme values are highlighted to indicate a need for special analysis to validate the data or explain abnormal distributions. The cumulative distributions of response values enable the user to calculate measures of central tendency and dispersion, such as the median and interquartile range. Footnotes are provided. A map, information sheet, glossary, and audit codes are appended. (Author abstract modified).

PB81-169708 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Attitude Module of the Landlord Survey, Site II, Wave 4. Housing Assistance Supply Experiment,
Patricia Boren, and Christina Witsberger. Aug 80, 83p RAND/N-1367-HUD, HUD-0001693
Contract HUD-H-1789

One of a series documenting survey data from the Housing Assistance Supply Experiment (HASE), this codebook describes the data on community attitudes collected in the final (wave 4) survey of landlords conducted in St. Joseph County, Ind., Site II of the experiment. The survey was administered from April through September 1978. This codebook documents the survey variables pertaining to landlord attitudes (collected in module K of the survey instrument) and associated variables derived from them. The derived variables include a landlord sample - selection indicator and record weight. For each variable, the codebook reproduces the exact text of the attitude question from module K or describes the construction of the derived variable, specifies all permissible responses, and tabulates the response distributions. Instructions to the survey staff that affect the interpretation of responses are also given. Footnotes and a glossary are included; audit codes are appended. (Author abstract modified).

PB81-169724 MF **A01**
HUD USER, Germantown, MD.
Compendium of Research Reports, October 1979.
Oct 79, 366p HUD-0001699, HUD/PDR-473/2(2)
Contract HUD-H-2664

The second compendium in a semiannual series lists over 1,500 research reports with abstracts produced by HUD's Office of Policy Development and Research from 1967 through 1974. The bibliography is divided into 55 subject areas which cover Federal and local housing programs, specific aspects of the housing industry, and topics relevant to housing programs such as energy and the elderly. Other examples of subjects treated are communication and information systems, condominiums, housing technology, land use and zoning, local government services, transportation, and urban observatories. Reports in the compendium were prepared by private consultants, universities, State agencies, local planning commissions and Federal agencies. Each citation provides the document's name, authors and / or organization responsible for the research, the address, date of publication, number of pages, and a report number, and by author for reference purposes. A subject index is appended. The compendium also contains availability and pricing information.

PB81-169732 MF **A01**
HUD USER, Germantown, MD.
Compendium of Research Reports, April 1980.
Apr 80, 220p HUD-0001700, HUD/PDR-473/3
Contract HUD-H-2664

The third compendium in a series contains 496 abstracts of research reports produced by HUD's Office of Policy Development and Research and entered in the HUD USER automated data base. The majority of the documents were published between 1975 and 1979 and are arranged according to 49 subject areas. Examples of topics covered in the bibliography are assisted housing, demographics, direct cash assistance, the experimental housing allowance programs, housing economics and statistics, local government organization and management, and research program support. The reports were prepared by private consultants, universities, State agencies, local planning commissions, and Federal agencies. Each citation provides the document's title, authors and / or organization responsible for the research, the address, date of publication, number of pages, and a report number. The document abstracts are arranged by subject areas, but they are also listed alphabetically by title, report number, personal author, and corporate author for reference purposes. A subject index is appended. Pricing and availability information is provided.

PB81-169740 PC **A08**/MF **A01**
HUD USER, Germantown, MD.
Compendium of Research Reports, July 1980.
Jul 80, 159p HUD-0001701, HUD/PDR-473/4
Contract HUD-H-2664

The fourth volume in the compendium series contains 361 abstracts of research reports produced by HUD's Office of Policy Development and Research and recently entered in the HUD USER automated data base. Most of the documents were published between 1975 and 1980 and are arranged according to 47 subject areas. These reports on research programs, demonstration projects, and other activities cover a wide range of topics related to the housing industry and government housing programs. Examples of subject categories are assisted housing, experimental housing allowance programs, housing / building codes and standards, local economic development, local government services, urban and region planning, and urban renewal. Each citation provides the document's title, authors or organization responsible for the research, the address, date of publication, number of pages, and a report number. The document abstracts are arranged by subject areas, but they are also listed alphabetically by title, report number, personal author, and corporate author for reference purposes. A subject index is appended. Availability and pricing information is provided.

PB81-169757 PC **A12**/MF **A01**
RAND Corp., Santa Monica, CA.
Supplemental Codebook for the Survey of Landlords, Site II, Wave 4. Housing Assistance Supply Experiment,
Patricia Boren, and Kenneth Wong. Aug 80, 268p RAND/N-1388-HUD, HUD-0001704
Contract HUD-H-1789

As part of the Housing Assistance Supply Experiment (HASE), the final (wave 4) survey of landlords was conducted in St. Joseph County, Ind. (Site II of the experiment), from April through September 1978. This codebook describes a set of variables derived from the original survey variables. For each derived variable, the codebook details the construction, specifies all permissible responses, and provides a tabulation of the unweighted responses recorded in the final master file, which contains 1,345 records. (The survey data are documented in N-1353-HUD and N-1367-HUD) 259 pp. (Author) Appendices and an index of variables are included.

PB81-169765 PC **A14**/MF **A01**
RAND Corp., Santa Monica, CA.
Supplemental Codebook for the Household Survey, Site II, Wave 4. Housing Assistance Supply Experiment,
Evelyn C. Casper, and Roberta Allen. Aug 80, 302p RAND/N-1380-HUD, HUD-0001705
Contract HUD-H-1789

Variables derived from data collected in the final (wave 4) household survey of tenants and homeowners are described in this codebook. The survey was conducted in St. Joseph County, Ind., Site II of the Housing Assistance Supply Experiment, from February through August 1978. For each derived variable, the codebook details the construction, specifies all permissible values, and provides frequencies of the unweighted values in the final master file of survey records. Derived variables consist of recodes, aggregations, and other transformations of original responses; data collected in a related survey or found in another data base pertaining to the same property, dwelling, or respondent; and sample - selection indicators. Extreme values are highlighted so a need for special analysis to verify the data or explain abnormal distributions are indicated. The cumulative distributions of response values enable the user to calculate measures of central tendency and dispersion, such as the median and interquartile range. A glossary of terms is included, and audit codes, debt algorithm, and an index of variables are appended.

PB81-169773 PC **A10**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Neighborhoods, Site II, Wave 4. Housing Assistance Supply Experiment,
Patricia Boren, and Carol Hillestad. Aug 80, 206p RAND/N-1362-HUD, HUD-0001706
Contract HUD-H-1789

This codebook is one of a series documenting survey data and derived variables from the Housing Assistance Supply Experiment (HASE). It describes the wave 4 survey conducted in St. Joseph County, Ind., neighborhoods (Site II of the experiment) from January 1978 through October 1979. Most HASE surveys are based on interviews and are addressed to a stratified probability sample of the county's residential properties. In contrast, the neighborhood survey is based on secondary research and direct observation and is addressed to the entire county. It has two parts, each with its own survey instrument: description of neighborhoods from local sources and observation of neighborhood street segments. The codebook documents the survey variables and a set of analytic variables derived from them. For each variable, the codebook reproduces the exact text from the survey instrument or describes how the variable was derived; specifies all permissible responses; and provides a tabulation of the responses recorded in the final master file of survey records. Where applicable, individual questions are annotated with instructions to the survey staff that affect the interpretation of responses. Neighborhood census data and audit codes are appended. (Author abstract modified).

PB81-169807 PC **A05**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

Research Needs and Guidelines on Women's Issues: Planning, Housing and Community Development,
Jacqueline Leavitt. 05 Nov 79, 76p HUD-0001716

This report suggests new research guidelines for analyzing women's issues and their relation to planning, housing, and community development. The guidelines are based on factors that take into account differences in the circumstances of women, household organization, relations within the household organization that affect relations in the public or work sphere, and the identification of women's issues with feminist theory and history. Another part of the report examines these factors in detail as a framework for a comprehensive analysis about women and planning, housing, and community development. Barriers to defining a woman's issue that arise from the organization and structure of the planning profession are also examined. A review of facts about household formation, birth rates, life span, and labor force participation by women continues the discussion. Finally, guidelines are proposed for research on women's issues in planning with emphasis on housing and community development. Tabular data, footnotes, and two appendices containing a national plan of action and selected data on households, family, and labor force participation are included.

PB81-169815 PC **A22**/MF **A01**
Bureau of the Census, Washington, DC.
Annual Housing Survey: 1977. Housing Characteristics for Selected Metropolitan Areas: Detroit, Michigan, Standard Metropolitan Statistical Area.
Apr 80, 509p HUD-0001717

This report presents statistics on housing and household characteristics in Detroit, Mich., from the 1977 - 78 Annual Housing Survey. The information for the survey was collected by personal interview from April 1977 through February 1978. The report presents statistics on general housing characteristics, indicators of housing and neighborhood quality, financial characteristics, recent mover households, and financial characteristics cross - classified by indicators of housing and neighborhood quality. The section on general housing characteristics consists of tables with data on selected housing characteristics for 1977, 1974, and 1970; characteristics of new construction units; and 1974 characteristics of housing units removed from the housing inventory. The same subject content given in these tables is also presented for households with black and Spanish household heads. The section on indicators of housing and neighborhood quality presents statistical data on characteristics for owner - occupied and renter - occupied housing units with black and Spanish heads of households and for vacant year - round housing units. Other tables present data on the characteristics of owner - occupied and renter - occupied housing units by family income; on the characteristics of owner - occupied, one - family homes by property value; and on the characteristics of renter - occupied housing units by gross rent. The same subject content is shown for housing units with black and Spanish heads of households. Tables with data on recent mover households present characteristics of all occupied housing units and units occupied by recent movers and other information concerning black and Spanish heads of household. Cross - tabulations are also shown of the indicators of housing and neighborhood quality by income, value, and gross rent. The same information is given for black and Spanish heads of household. Appendices describe the geographic area classifications; provide definitions and explanations of the subjects in the report; and present information on sample design, estimation, and accuracy of data. Maps and table - finding guides are included. (Author abstract modified).

PB81-169823 PC **A23**/MF **A01**
Bureau of the Census, Washington, DC.
Annual Housing Survey: 1977. Housing Characteristics for Selected Metropolitan Areas: Boston, Massachusetts, Standard Metropolitan Statistical Area.
Apr 80, 548p HUD-0001718

This report presents statistics on housing and household characteristics in Boston, Mass., from the 1977 - 78 Annual Housing Survey. The information for the survey was collected by personal interview from April 1977 through February 1978. The report presents statistics on general housing characteristics, indicators of housing and neighborhood quality, financial characteristics, recent mover households, and financial characteristics cross - classified by indicators of housing and neighborhood quality. The section on general housing characteristics consists of tables with data on selected housing characteristics for 1977, 1974, and 1970; characteristics of new construction units; and 1974 characteristics of housing units removed from the housing inventory. The same subject content given in these tables is also presented for households with black and Spanish heads of households. The section on indicators of housing and neighborhood quality presents statistical data on characteristics for owner - occupied and renter - occupied housing units with black and Spanish heads of households and for vacant year - round housing units. Other tables present data on the characteristics of owner - occupied and renter - occupied housing units by family income; on the characteristics of owner - occupied, one - family homes by property value; and on the characteristics of renter - occupied housing units by gross rent. The same subject content is shown for housing units with black and Spanish heads of households. Tables with data on recent mover households present characteristics of all occupied housing units and units occupied by recent movers and other information concerning black and Spanish heads of household. Cross - tabulations are also shown of the indicators of housing and neighborhood quality by income, value, and gross rent. The same information is given for black and Spanish heads of household. Appendices describe the geographic area classifications; provide definitions and explanations of the subjects in the report; and present information on sample design, estimation, and accuracy of data. Maps and table - finding guides are included. (Author abstract modified).

PB81-169831 PC **A07**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Residential Energy Efficiency Standards Study.
Final rept.
Jul 80, 144p HUD/PDR-614, HUD-0001733
Contract HUD-H-5040

This is the final report to the Congress on the Residential Energy Efficiency Standards Study conducted by HUD in coordination with other Federal agencies as directed in Section 253 of the National Energy Conservation Policy Act of 1978 (Public Law 95 - 619). Six major issue areas address the concerns raised in the legislation, including the feasibility of developing an energy efficiency standard for existing units, the amount of energy that would be saved by the implementation of a mandatory standard over and above the energy savings estimated as resulting from current programs, and the impact of such a standard on individual households. Other concerns are how the implementation would affect credit availability and related financial matters, how it would affect the building community, and what major administrative options are available to implement the Section 253 requirement. This document integrates and highlights the findings of the principal support contractors. It presents contractors' findings and recommendations concerning the feasibility of a mandatory regulatory action as described in Section 253 and on related energy conservation policies and initiatives. Based on this technical work, the HUD recommendation does not favor a federally mandated time - of - sale program. The legislation and technical analysis information are appended.

PB81-169856 MF **A01**
National Inst. of Law Enforcement and Criminal Justice, Washington, DC.
Factors Influencing Crime and Instability in Urban Housing Developments.
Executive Summary,
Oscar Newman, and Karen A. Franck. Aug 80, 51p HUD-0001789

This executive summary condenses the information of a much larger document produced under grant from the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U.S. Department of Justice. The purpose of the study was to investigate certain 'built - in' characteristics of federally - assisted housing projects to determine whether those characteristics contribute to crime, fear, and instability and, if so, which of these are most contributory. Emphasis is given to examination of the role played by physical factors such as entry ways, adjacent common grounds, building layout and site design, real barriers (fences, locks, intercoms), and the presence of security personnel. Newark, St. Louis, and San Francisco provided the 63 federally - assisted, moderate - income developments studied. The developments consist of row house, walk - up, and high - rise buildings with a varied composition of rent - subsidized residents. Path analysis is used to estimate the model and to calculate total, direct, and total indirect effects. Major findings, directions for future research, and policy implications are discussed. Tables, graphs, and references are included.

PB81-803264 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Family Counseling. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 113p
Supersedes PB80-803620, and NTIS/PS-78/1343.

The concept of involving family members in the counseling of an individual is described in the citations. Reports on counselor training and program effectiveness are included. Most of these studies relate to disadvantaged or handicapped families. (This updated bibliography contains 105 citations, 12 of which are new entries to the previous edition.)

PB81-803579 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Explosives, Narcotics, and Personnel Detection Using Dogs. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 55p
Supersedes PB80-803182, and NTIS/PS-78/1325.

The citations cover the use of dogs by law enforcement personnel or by the military to detect explosives, narcotics and people. A few reports are included which cover the use of dogs in riot control and in military operations. Some attention is also paid to sensitivity and responses in the detector dog. (This updated bibliography contains 46 citations, none of which are new entries to the previous edition.)

PNL-3403 PC **A08**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Community Stress and Social and Technological Change: A Framework for Interpreting the Behavior of Social Movements and Community Action Groups.
R. W. Perry, C. R. Schuller, M. K. Lindell, M. R. Greene, and J. T. Walsh. Jun 80, 158p B-HARC-411/80/034
Contract AC06-76RL01830

The purpose of this report is to provide a comprehensive examination of existing research on community organizations and community political systems. These findings will be integrated into a framework for understanding the variety of social and political responses which may be manifest in small communities facing the prospect of hosting a major nuclear facility. The principal focus is on the formation and behavior of social groups in communities, particularly politically oriented social movements or community action groups. This analysis is set on the context of a community experiencing social stress. Most of the discussion which follows is based on an extrapolation from the large body of reseach literature on the topics in sociology, political science, and psychology. Chapter I examines the community political systems which are the arena in which local action groups will operate. Chapter II focuses on the internal conditions necessary for the formation and maintenance of com-

munity action groups. Chapter III reviews the research literature on the social environment of organizations in communities and the external conditions which are necessary to maintain organizations over time. Chapter IV develops a logic whereby the community consensus model can be adopted to particular social movement organizations and community actions groups. Chapter V examines changes in aspects of the environment which can be a function of the operation of movement organizations, and changes in the structure and tactics of movement organizations which appear to be a response to the environment. (ERA citation 06:005321)

6.

BIOLOGICAL AND MEDICAL SCIENCES

PB81-932300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Antitumor and Antiviral Agents: Experimental Therapeutics, Toxicology, Pharmacology.
Cancergram CB20.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram concentrates on the effectiveness of chemical agents and preparations in controlling tumor growth, metastasis, and viruses associated with tumors. These agents include substances undergoing initial testing for efficacy as well as established antitumor drugs currently being used in new treatment regimens. The Cancergram covers in vivo and in vitro testing of animals and animal cell lines, and in vitro exposure of human cell lines to these agents. In keeping with the preclinical orientation of this Cancergram, studies involving the administration of drugs to patients for the establishment of clinical treatment protocols are excluded. Emphasis is placed on dose-response and biological activity studies, establishment of lethal and toxic dose levels, the comparative toxicity and efficacy of agents used independently, and the potentiating or antagonistic interactions of agents used in combination. Biochemical and physiological aspects of the actions and metabolism of antitumor agents are not in scope; these topics are covered in Cancergram CB19, entitled Antitumor and Antiviral Agents--Mechanisms of Action.

6A. Biochemistry

AD-A093 529/6 PC **A02**/MF **A01**
Louisiana State Univ. Medical Center, New Orleans.
Cyclo (His-Pro): A Selective Inhibitor of Rat Prolactin Secretion In Vitro.
Technical rept.,
Chandan Prasad, John F. Wilber, V. Akerstrom, and Arnold Banerji. 18 Sep 80, 6p
Contract N00014-80-C-0416
Pub. in Life Sciences, v27 n21 p1979-1983 1980.

No abstract available.

COO-4374-4 PC **A02**/MF **A01**
Boston Biomedical Research Inst., MA.
Polycyclic Aromatic Hydrocarbon: Protein Interactions. Progress Report, March 1, 1980-February 28, 1981.
E. Fujimori. Nov 80, 9p
Contract AS02-77EV04374

Interacting with bovine serum albumin (BSA), both the very weak carcinogenic hydrocarbon benzo(e)pyrene (Bep) and the powerful carcinogen benzo(a)pyrene (BaP) form pyrene-type compounds, indicating chemical modification at the bay region of the molecules. In constrast to the BaP-BSA reaction apparently similar to the metabolic activation to the bay region oxidation product, the BeP-BSA reaction differs from the known metabolic change of BeP which occurs at the K-region. While the BaP-BSA reaction also produces a BaP radical as well as other uv-fluorescent species, no BeP radical is formed in interaction with BSA and two sharp uv fluorescences at about 330 and 350 nm probably come from the higher excited states of BeP. Furthermore, from fluorescence and excitation spectral studies particularly at low temperature, it is suggested that the uv fluorescences at 320 to 380 nm of the BaP-BSA complex originate from a few distinct species. A new uv fluorescence at 330 nm (preferentially excited at 295 nm), as well as a new excitation peak at 325 nm for the longer wavelength uv fluorescences at 357 and 378 nm, has been found. The extract from the aqueous BaP-BSA solution also emits phosphorescence at 400-440 nm (excited at 310 nm) in EPA solution. (ERA citation 06:006492)

IAEA-R-1806-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Development of Radioimmunoassay for Somatostatin, Its Use in the Measurement of This Peptide in Tissues and Biological Fluids, and an Assessment of Its Physiological Role in Health and Disease. Final Report for the Period 1 June 1976 - 31 May 1979.
B. Pimstone, and M. Sheppard. Jun 79, 26p
U.S. Sales Only.

Somatostatin peptide initially isolated from ovine hypothalamus has inhibitory effect on secretion growth hormone and on other pituitary hormones like TSH, ACTH. The assay sensitivity was approximately 6 pg/tube. The authors did not observe any significant crossreactivity with 19 different hormones and biological substances. High concentration of somatostatin was found in central nervous system, not only in median eminence of hypothalamus but also in other areas including spine cord. High level of somatostatin was also observed in pancreas, gastric antrum and distal colon. The determinations of somatostatin-like in sera of 22 men and 26 women allowed to establish the normal values which are 0.274+-0.009 ng/ml. MCR in normal subjects was 1949+-250 ml/min, in cases with chronic liver disease the values were similar, and in subjects with chronic renal failure highly significant lowering of MCR equal 501+-32.7 ml/min was observed. Tsub(1/2) varied from 1.1 to 3.0 min in normal subjects, in patients with liver diseases was in ranges 1.2 - 4.8 min and in chronic renal failure from 2.6 - 4.9 min. (Atomindex citation 11:525354)

PB81-149221
(Order as PB81-149148, PC **A05**/MF **A01**)
Sichuan Inst. of Antiparasitic Diseases, Chengdu (China).
Disc Electrophoretic Studies of Hookworms. Preliminary Comparison of Protein Fraction in Adult 'Necator americanus', 'Ancylostoma duodenale' and 'Ancylostoma caninum',
Wang Fenglin, Yang Guangmin, and Wang Xiuzhen. Dec 80, 4p
Included in Chinese Medical Jnl., v93 n12 p857-860 1980.

Experimental study of the soluble protein fractions of Nector americanus, Ancylostoma duodenale and A. caninum by disc electrophoresis using polyacrylamide gel was performed in adult worms obtained from 19 puppies infected artificially. In comparison with the total 124 gel columns, all results such as number of bands, densitometric tracings and even the site of peaks are obviously related to the differences in the proteins. With respect to biochemical differences between species, this procedure is readily reproducible and highly sensitive and may help identify hookworm species differences by differentiating their protein fractions.

PB81-858870 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lysosomes. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Jan 81, 104p

This retrospective bibliography contains citations concerning lysosomes. Discussed are the methods for separating and the effect of various substances on the lysosomal membrane. These include substances which stabilize the membrane and substances which disrupts the integrety of the membrane. Also discussed is the characterization of the lysosomal enzymes. (Contains 81 citations, fully indexed and including a table of contents.)

6B. Bioengineering

N81-15675/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Bioelectrical Activity of Limb Muscles During Cold Shivering of Stimulation of the Vestibular Apparatus.
G. I. Kuzmina. Sep 80, 14p NASA-TM-76334
Contract NASW-3199
Transl. Into English from Fiziol. Zh. SSSR im., I. M. Sechenova (USSR), V. 66, No. 5, 1980 p 702-708. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By State Univ., Petrozavodsk, USSR.

The effects of caloric and electric stimulation of the vestibular receptors on the EMG activity of limb muscles in anesthetized cats during cold induced shivering involved flexor muscles alone. Both types of stimulation suppressed bioelectrical activity more effectively in the ipsilateral muscles. The suppression of shivering activity seems to be due to the increased inhibitory effect of descending labyrinth pathways on the function of flexor motoneurons.

N81-15682/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Instrument for Two-Speed Optokinetic Stimulation.
I. F. Kandaurov, L. A. Shestak, and Y. A. Kuvshinov. Sep 80, 6p NASA-TM-76364
Contract NASW-3198
Transl. Into English from Zh. Ushnykh Nosovykh Gorlovykh Bolez. (USSR) No. 3, 1980 p 78-79. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Kermerovo Medical Inst.

A device for providing optokinetic stimulation is described which has the advantages of being small, simple in design, and permits automatic operation in four directions at two drum speeds. The device has a screened chamber allowing polygraphic recording of optokinetic reactions by EEG.

N81-15683/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Instruments and Attachments for Electronystagmography.
Y. T. Mironenko, and A. A. Vilenskiy. Sep 80, 6p
NASA-TM-76365
Contract NASW-3198
Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Leningrad Sci. Res. Inst. Of Diseases of the Ear, Throat, Nose and Speech. Transl. Into English from Zh. Usnykh Nosovykh I Gorlovykh Bolez. (USSR), No. 3, 1980 p 79-81.

A portable set of instruments and devices was developed which makes it possible to record spontaneous nystagmus with open and closed eyes. Rotational, caloric, position, and pressure nystagmus under any conditions may also be recorded.

N81-15684/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.

Main Principles and Technique of Electronystagmography (A Brief Survey of the Literature).
K. S. Tanchev. Sep 80, 16p NASA-TM-76366
Contract NASW-3198
Transl. into English from Zh. Ushnykh Nosovykh Gorlovykh Bolez. (USSR), No. 3, 1980 p 82-86. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Electronystagmography (ENG) is one of the modern methods for objective recording of nystagmus, its quantitative and qualitative assessment. It is used more and more often in clinical practice. A brief review of the history of recording of nystagmus and a survey of the relevant literature is presented.

6C. Biology

BNL-51294 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
1980 Breeding Bird Censuses.
G. S. Raynor. Sep 80, 8p
Contract AC02-76CH00016

As part of a program to characterize the plant and animal life of the Laboratory site and the surrounding region, the two breeding bird censuses originated in 1977 were continued in 1980. Coverage was below that of previous years due to illness and travel of some participants, but 11 trips were made to the BNL plot and 8 to the Westhampton plot. Each was censused by separate teams of three volunteer observers. The number of breeding species and number of territorial males on the BNL plot have progressively declined since 1977 but little change has taken place in either number of territories or species composition on the Westhampton plot. (ERA citation 06:006462)

PB81-148488 PC **A02**/MF **A01**
National Marine Fisheries Service, Galveston, TX. Galveston Lab.
Commercial Brown, White and Pink Shrimp Tail Size: Total Size Conversions.
Technical memo.,
Susan L. Brunenmeister. Jun 80, 10p NOAA-TM-NMFS-SEFC-20, NOAA-80110710

Equations for converting tail length to total length and tail weight to total weight and vice versa were obtained for white, brown and pink shrimp (Penaeus setiferus, Penaeus aztecus and Penaeus duorarum, respectively), using linear regression analyses. The available data consisted of measurements taken on shrimp samples obtained during shrimp tagging studies conducted by Southeast Fisheries Center, Galveston Laboratory during 1979 and the latter part of 1978.

PB81-148694 PC **A08**/MF **A01**
National Marine Fisheries Service, Washington, DC.
Modeling Commercial Fishing Gear by the Method of Analog Mechanisms,
V. P. Kondrat'ev. c1980, 164p TT-75-52015
Trans. of mono. Modelirovanie Orudii Promyshlennogo Rybolovstva Metodom Mekhanicheskikh Analogii, Moscow, 1973, by M. M. Sivaramakrishnan. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The book deals with the problems of introduction of methods of analog mechanisms (simulation) in the study of the operation of commercial fishing gears. It examines theoretical principles of the method, sequence of operations and actual trials, experimental setup and the necessary equipment. Special attention has been paid to the use of the method of analog mechanisms in designing trawls which are the most important gears in modern fisheries and which account for more than half the catch of fish in the Soviet Union.

PB81-150831 PC **A14**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Phytoplankton Water-Quality Relationships in U.S. Lakes. Part VIII: Algae Associated with or Responsible for Water-Quality Problems.
Rept. for 7 Mar-14 Nov 73,
W. D. Taylor, L. R. Williams, S. C. Hern, V. W. Lambou, and F. A. Morris. Dec 80, 325p EPA-600/3-80-100
Prepared in cooperation with Nevada Univ., Las Vegas. Dept. of Biological Sciences.

Environmental data are presented for 117 species and 24 genera of freshwater algae that have been associated with or are responsible for water quality problems. The environmental data are based upon algal occurrence records from 250 lakes sampled in Eastern and Southeastern States. The water quality problems addressed include eutrophication, organic pollution, taste and odor, filter clogging, toxicity, and aesthetic nuisance. Data presented illustrate that most genera and species associated with eutrophic conditions also occur in nutrient-poor waters, thus limiting their indicator value with respect to nutrient enrichment.

PB81-153579 PC **A02**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Average Density Index for Walleye Pollock, 'Theragra chalcogramma', in the Bering Sea.
Technical memo.,
Loh-Lee Low, and Ikuo Ikeda. Nov 80, 19p NOAA-TR-NMFS-SSRF-743, NOAA-80122301

The data base and an average density index (ADI) procedure for assessing walleye pollock, Theragra chalcogramma, abundance in the eastern Bering Sea were evaluated. The data base consisted of daily catch-effort records of individual fishing vessels in the Japanese groundfish fishery from 1964 to 1976. From 1964 to the early 1970s, overall ADI and CPUE (catch per unit effort) trends increased as a result of increased pollock abundance and fishing power of vessels. For 2-3 years during the early 1970s, abundances of pollock were at peak levels. Beginning in 1972, abundance declined but stabilized during 1975-78 at an intermediate level.

PB81-155012 PC **A02**/MF **A01**
National Marine Fisheries Service, Washington, DC.
Annual Report on Dall Porpoise - Salmon Research, A Report to Congress.
Jul 79, 19p NOAA-80123105
Conducted under International North Pacific Fisheries Convention Japan - United States Memo of Understanding April 25, 1978, North Pacific Fisheries Act of 1954 as Amended April 1, 1978, to March 31, 1979.

The research studies on salmon stocks and the problems of incidental take of marine mammals in the Japanese High Seas salmon fishery are described. Available data is inadequate to determine current population size, total incidental take, or the rates of reproduction and natural mortality for Dall porpoises, Phocoenoides dallii. North Pacific fur seals, Callorhinus ursinus, are also taken incidentally in the salmon fishery. The level of that take has decreased in recent years. Effective means to reduce the incidental take of mammals in the salmon fisheries are also unknown.

PB81-802381 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Endangered Species. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 171p
Supersedes PB80-802028, and NTIS/PS-78/1267.

The selected abstracts cover wildlife management, animal ecology, plant ecology, aquatic animals, birds, highway construction, and air and water pollution as related to endangered species. (This updated bibliography contains 164 citations, 42 of which are new entries to the previous edition.)

PB81-932500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Molecular Biology: DNA.
Cancergram CB25.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers most aspects of DNA metabolism in normal and neoplastic cells. Emphasis is on mechanisms of DNA replication and repair, and on DNA structure, sequence, and modification. Studies of chromatin and nucleosome structure and modification are included; however, studies emphasizing the associated nuclear proteins are covered in Cancergram CB27, and cytogenetic studies are the topic of Cancergram CB12. As the primary focus of this Cancergram is on cellular processes, inclusion of studies of viral DNA metabolism is limited to those which may elucidate basic aspects of cellular DNA metabolism. DNA viruses and viral replication are comprehensively covered by Cancergrams CB04 and CB11. Coverage of DNA repair focuses on mechanisms of repair rather than the induction of damage by chemicals or radiation, topics already covered by Cancergrams CK11 and CK06. DNA as template for RNA transcription is also excluded, as transcription is specifically covered in Cancergram CB26.

PB81-932700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Molecular Biology: Proteins, Polypeptides, Amino Acids.
Cancergram CB27.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram concerns cancer-related biochemical and physicochemical studies of the synthesis, metabolism, structure, and characterization of proteins. This includes absorption and transport of amino acids; the intracellular events in RNA; protein translation; the final assembly of polypeptides and proteins; and the biological transformation, degradation, and excretion of proteins and protein end products. The Cancergram covers structural and functional characterization of major classes of cellular proteins, such as histones and other nuclear proteins, the microsomal system, cytoskeletal and mitotic proteins, and both surface and intracellular membrane proteins. Emphasis is placed on observable differences in these protein properties between normal and tumor cells. Studies of extracellular proteins, plasma proteins, and tumor products are generally excluded, except where they provide insight into the basic processes of protein metabolism. Polyamines are covered in a special category within this Cancergram. Additional coverage of specific proteins of current research interest is provided in the following Cancergrams: CB01, Oncofetal Proteins; CB24, Hormones in Cancer-related Biology-non-steroid hormones; CB06, Structural and Functional Aspects of Cell Membranes; CB16, Cell Biology-growth Regulation, Differentiation; CB08, Immunobiology and Cancer-Antibodies and Humoral Immunity; and CB05, Immunobiology and Cancer-Tumor-Associated Antigens.

6D. Bionics

PB81-803215 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Robots. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 197p
Supersedes PB80-803836, and NTIS/PS-79/0003.

The bibliography cites research on the design and application of robots. It includes studies on software development, memory models, and manipulation control algorithms. Also included are the many problem solving features of robots and space exploration applications. (This updated bibliography contains 190 citations, 31 of which are new enries to the previous edition.)

6E. Clinical Medicine

AD-A093 447/1 PC **A03**/MF **A01**
Center for Blood Research, Boston, MA.
Cryogenic Preservation of Monocytes from Human Blood and Plateletpheresis Cellular Residues.
Annual rept. 1 Dec 79-30 Nov 80,
S. M. Hunt, Fabian J. Lionetti, C. R. Valeri, and A. B. Callahan. 20 Dec 80, 29p Rept no. TR-1
Contracts N00014-80-C-0239, N00014-79-C-0168

A separation procedure was devised for the isolation of human monocytes from buffy coat of whole blood and the cellular residues in platelet bags after plateletpheresis of donors with the Haemonetics Model 30 Cell Processor. The mononuclear cells were isolated using Ficoll-Isopaque (Lymphoprep) and monocytes were then separated from lymphocytes by centrifugal cytography using two separation chambers in a Beckman JE-6 rotor. About 30,000,000 monocytes were obtained from 100 ml of whole blood. These were 93% myeloperoxidase positive (MPO), while 98% showed intact membranes in the fluorescein diacetate (FDA)eithidium bromide (EB) test. Eight-seven percent ingested 1-5 or more opsonized latex particles and 93% ingested 1 or more ethidium-treated zymosan particles. In three procedures 1,000,000,000 monocytes were obtained from cellular residues in platelet bags. Monocytes were frozen using 5% dimethylsulfoxide (DMSO), 6% hydroxyethyl starch (HES), 4% albumin, and 56 mM glucose in Normosol-R, pH 7.1. Two ml aliquots containing 6.7 x 10 to the sixth power - 7.2 x 10 to the sixth power monocytes were cooled at 4 C per minute to -80 C, transferred and stored for 1 to 3 months in liquid nitrogen. After storage for periods up to 3 months, they were thawed. In some studies the monocytes were diluted to reduce the DMSO to 1.25 percent and in others the monocytes were washed with a 4-fold volume of the solution used to freeze them, but without DMSO. Ninety-eight percent of monocytes frozen were recovered morphologically intact, 90 percent were MPO positive, and 87 percent were FDA positive.

AD-A093 476/0 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
The Rift Valley Fever Epizootic in Egypt 1977-78. 2. Ecological and Entomological Studies.
Technical scientific rept.,
Harry Hoogstraal, James M. Meegan, Galila M. Khalil, and Fatma K. Adham. 1979, 9p Rept nos. NAMRU-3-TR.29/80, NAMRU-ACC-1207
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v73 n6 p624-629 1979.

No abstract available.

AD-A093 477/8 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
An Epizootic of Rift Valley Fever in Egypt in 1977.
Technical scientific rept.,
James M. Meegan, Harry Hoogstraal, and M. I. Moussa. 1979, 4p Rept nos. NAMRU-3-TR.25/80, NAMRU-ACC-1205
Pub. in The Veterinary Record, v105 n6 p124-125, 11 Aug 79.

No abstract available.

AD-A093 478/6 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
Epidemic Rift Valley Fever in Egypt: Observations of the Spectrum of Human Illness.
Technical scientific rept.,
Larry W. Laughlin, James M. Meegan, Larry J. Strausbaugh, David M. Morens, and Raymond H. Watten. 1979, 7p Rept nos. NAMRU-3-TR.30/80, NAMRU-ACC-1208
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v73 n6 p630-633 1979.

No abstract available.

AD-A093 479/4 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
Antibodies to Rift Valley Fever Virus in Swedish U.N. Soldiers in Egypt and the Sinai.
Technical rept.,
Bo Niklasson, James M. Meegan, and Elias Bengtsson. 1979, 4p Rept nos. NAMRU-3-TR.26/80, NAMRU-ACC-1203
Pub. in Scandinavian Jnl. of Infectious Diseases, v11 p313-314 1979.

No abstract available.

AD-A093 485/1 PC **A08**/MF **A01**
Institute of Environmental Medicine and Physiology, Seattle, WA.
The Pathophysiology of Decompression Sickness and the Effects of Doppler Detectable Bubbles.
Technical rept. no. 4, 1974-1978,
Michael R. Powell, and Merrill P. Spencer. 18 Dec 80, 165p
Contract N00014-73-C-0094

The optimal use of ultrasonic bubble detectors requires a knowledge of the various pathophysiological consequence of gas phase formation in the body following decompression. Our studies during the later portion of this contract have been focused primarily on an understanding of decompression sickness as illuminated by the Doppler ultrasonic bubble detector. Studies of the amount of gas in the central venous system have shown that the Doppler bubble detectors are quite sensitive devices which are capable of detecting small quantities of dispersed gas. While gas bubbles with a very small radius may not be detectable in the precordial mode, the device can easily detect amounts smaller than 0.01 cc/kg/min. Gas introduced into the central venous system by means of a catheter will elicit a rise in the right ventricular systolic pressure (RVSP) as the gas embolizes the pulmonary vasculature. The degree of rise is a function of the gas embolization rate. Following hyperbaric decompression, the RVSP is elevated by inert gas emboli. Assuming a steady state, the amount of gas needed for any RVSP can be deduced. For a precordial Grade IV (in sheep) this is 0.03 cc/kg/min. Gas injected (per catheter) at this 0.03 rate produce neither signs of dyspnea nor can bubbles be detected in the systemic arteries (by a Doppler probe on the carotid artery). The smaller dysbarogenic bubbles (in contrast to catheter-produced) in concert with Grade IV or Grade V precordial bubbles, and the associated increase in RVSP, will often promote inert gas arterialization. Neurologic decompression sickness could result. (Author)

AD-A093 592/4 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Health Care Cost Containment Education for Physicians in the Military Health Services System.
Master's thesis,
John Edward Carsten. Sep 80, 86p

This paper examines the underlying causal factors relative to spiralling health care costs. Special emphasis is placed on the role and responsibility of the physician concerning these costs. The physician's dominant role and patterns of practice are seen as significant determining factors in the total expenditures for health care. Overall lack of incentives for cost effective medical practice, lack awareness of the economic impact of physician's decisions, and insufficient resource management skills on behalf of the physician combine to further exacerbate the problem of rising health care costs. Cost containment education for physicians is seen as a method of injecting cost awareness and cost-benefit analysis into the medical education process early in the physician's career before his practice patterns are set. Emphasis is placed on the balance of access, quality, and cost of health care costs. Cost containment education for physicians is seen as a viable alternative to continued regulatory control of health care costs. Cost containment education for Military Health Services System (MHSS) physicians is seen as especially desirable due to their increased authority and responsibility within the organizational structure. A cost containment education program for MHSS physicians is outlined in this paper with recommendations for a pilot project. (Author)

AD-A093 598/1 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Application of a Health Service Growth Model to Determine the Management Requirements of Health Service Providers.
Master's thesis,
Patrick Allen Shannon. Sep 80, 93p

This study was an attempt to present a method by which the identification of the hospital CEO/CO can be determined through the use of a model which considers facility management requirements and orientations. The conclusion drawn was that CEO/CO selection should be based upon the respective orientations of the system rather than professional credentials alone.

AD-A093 653/4 Not available NTIS
Microcirculatory Society.
Microvascular Research: Abstracts of the World Congress for Microcirculation (2nd). Volume 17, Number 3. Part 2.
Final rept. 1 Mar-31 Dec 79,
Benjamin W. Zweifach. May 79, 213p
Grant N00014-79-G-0024
Proceedings of World Congress for Microcirculation (2nd) Held in La Jolla, CA, 22-29 Jul 79.
Availability: Academic Press, Inc., 111 Fifth Ave., New York, NY 10003 HC $23.00 (No copies furnished by DTIC/NTIS).

Contents: Biomechanics of Microvascular; Microvessel Structure; 'Use chapter headings pages III to XXIV. Omit no. and combine 4 & 5 to be 'Skeletal Muscle Hemodynamics'. add 'and' before the last term.

AD-A093 663/3 PC **A02**/MF **A01**
Duke Univ. Medical Center, Durham, NC. F.G. Hall Lab. for Environmental Research.
Evidence for Gas Nuclei in Decompressed Rats,
R. D. Vann, J. Grimstad, and C. H. Nielsen. Dec 79, 6p
Contract N00014-77-C-0406, Grant PHS-HL07896
Availability: Pub. in Undersea Biomedical Research, v7 n2 p107-112, Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 677/3 PC **A02**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Technical Evaluation Report of the Aerospace Medical Panel Working Group WG-08 on Evaluation of Methods to Assess Workload.
Advisory rept.,
Bryce O. Hartmen. Nov 80, 21p Rept no.
AGARD-AR-139

Military aircraft are becoming increasingly complex, the associated avionics systems more sophisticated, and the mission profiles more demanding. The problem is to establish if such an increase in aircrew workload has become a limiting factor in the operational employment of some aircraft and to select viable methods to assess it. The methods of assessing workload are set forth in AGARDograph AG-246 'Survey of Methods to Assess Workload' which was published in August 1979. This companion document sets forth conclusions on workload measurement methodology. (Author)

AD-A093 721/9 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Development of an Outpatient Medical Treatment Reporting System for Shipboard Use,
Lawrence A. Hermansen, Allan P. Jones, and Mark C. Butler. 1979, 8p Rept no.
NAVHLTHRSCHC-78-59
Pub. in U.S. Navy Medicine, v71 n1 p16-21 Jan 80.

No abstract available.

AD-A093 763/1 PC **A02**/MF **A01**
Army Medical Intelligence and Information Agency, Fort Detrick, MD.
Process for the Manufacture of Blood Compatible Sorbents for Extracting Exogenous and Endogenous Poisons (Verfahren zur Herstellung von mit Blut Vertraglichen Sorbenzien Zum Auszug von exo-und Endogenen Giften),
Vasilij V. Korschak, Jurij A. Lejkin, Anatolij J. Neronov, Ljudmila A. Tichonova, and Anatolij V.

Rjabov. 17 Dec 80, 25p Rept no. USAMIIA-HT-131-80
Trans. of Patent (Germany, F.R.) 270 083, 8p 30 Nov 78.

No abstract available.

AD-A093 782/1 PC **A03**/MF **A01**
Army Inst. of Dental Research, Washington, DC.
Identification of Leukocyte Subpopulations Responsible for the Production of Osteoclast Activating Factor and their Role in Bone Resorption.
Final rept. Oct 77-Sep 80,
Charles E. Hawley. 31 Dec 80, 38p Rept no. OG-6039

Osteoclast Activating Factor (OAF) was predictably produced in large volume mitogen stimulated MNC cultures. OAF production was independent of DNA synthesis. OAF was produced in mixed leukocyte cultures containing heat inactivated fetal calf serum. OAF production was independent of blastogenesis. OAF activity was isolated in the molecular weight range of 12,000 to 25,000 daltons by S-200 Sephacryl chromatography and high performance liquid chromatography (HPLC). OAF activity was concentrated across membranes and by ammonium sulfate precipitation. Subsequent HPLC produced two peaks of bone resorbing activity: a major peak at 18,000 daltons and a minor peak at 9,000 daltons. MNC culture supernatants also contained high concentrations of low molecular weight prostaglandins which also are believed to be osteolytic in vitro. (Author)

AD-A093 835/7 PC **A03**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Gas Liquid Chromatography of Trace Elements.
Technical rept.,
Michael L. Taylor. 1971, 29p Rept no. AFAMRL-TR-70-101
Pub. in Gas Liquid Chromatography of Trace Elements, p363-389 1971.

No abstract available.

AD-A093 839/9 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Rapid Detection of Pneumococcal Antigens in Sputum and Blood Serum Using a Coagglutination Test.
Final rept.,
Earl A. Edwards, Michael E. Kilpatrick, and Dennis Hooper. 1980, 6p Rept no. NAVHLTHRSCHC-78-45
Pub. in Military Medicine, v145 n4 p256-258 Apr 80.

No abstract available.

AD-A093 840/7 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Coagglutination and Counterimmunoelectrophoresis for Detection of Pneumococcal Antigens in the Sputum of Pneumonia Patients.
Final rept.,
Earl A. Edwards, and J. Donald Coonrod. 1980, 7p Rept no. NAVHLTHRSCHC-79-36
Pub. in Jnl. of Clinical Microbiology, v11 n5 p488-491 May 80.

No abstract available.

AD-A093 846/4 PC **A02**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Medicine.
Pathophysiology of Relapsing Fever: Interaction of Borrelia Spirochetes with Blood Mononuclear Leukocytes Causes Production of Leukocytic Pyrogen and Tissue Thromboplastin.
Technical rept.,
Thomas Butler. 10 Dec 80, 14p Rept no. TR-4
Contract N00014-77-C-0050

Relapsing fever caused by Borrelia spirochetes is characterized by episodes of spirochetemia, fever, and disseminated intravascular coagulation (DIC). We examined the ability of Borrelia hermsii, which does not contain endotoxin, to induce production of leukocytic pyrogen and thromboplastin from human blood leukocytes in vitro. Cultures of B. hermsii were washed with pyrogen-free saline. Mononuclear cells (MNC) were separated from blood by Ficoll-Hypaque gradient sedimentation and incubated with 2-5 spirochetes per MNC in 10% human serum. Supernatants from 5 times 10 to the 7th power cells were assayed in rabbits for fever production. Intact MNC were simultaneously assayed for thromboplastin activity with a modified one-stage prothrombin time employing normal human plasma and plasma deficient in individual coagulation factors. Supernatants of the MNC-spirochete mixtures produced mean increases in temperature of 0.80-1.35 deg C, which were significantly higher than supernatants of MNC, 0.13 deg C, or spirochetes alone, 0.10 deg C (p less than 0.05). MNC-spirochete mixtures possessed 7 to 15 times the thromboplastin activity of MNC suspensions. Promotion or inhibition of phagocytosis by adding respectively immune rabbit serum or cytochalasin B did not alter production of leukocytic pyrogen or thromboplastin.

AD-A093 856/3 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
The Rift Valley Fever Epizootic in Egypt 1977-78. 1. Description of the Epizootic and Virological Studies.
Technical rept.,
James M. Meegan. 1979, 8p Rept nos. NAMRU-3-TR-28/80, NAMRU-3-ACC-1206
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v73 n6 p618-623 1979.

No abstract available.

AD-A093 857/1 PC **A02**/MF **A01**
Naval Dental Research Inst, Great Lakes, IL.
Dextranase-Producing Organisms in Dental Plaque from Caries-Free and Caries-Active Naval Recruits,
B. L. Lamberts, I. L. Shklair, and R. G. Walter. 13 Nov 79, 5p Rept no. NDRI-PR-80-15
Pub. in Experientia, v36 p944 1980.

No abstract available.

AD-A093 947/0 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Entomology and Nematology.
Transmission of Microsporidian Parasites of Mosquitoes.
Annual rept. no. 1, 1 Jan-31 Dec 80,
Donald W. Hall, and Edwin I. Hazard. 12 Jan 81, 13p
Contract N00014-80-C-0172

Studies were conducted on dimorphic microsporidian parasites of the mosquitoes Culex peccator, Culex pilosus, Culiseta inornata, Aedes taeniorhynchus, and Deinocerties cancer. The parasites of C. pilosus D. cancer are unusual in that two types of spores (presumably haploid and diploid) are found simultaneously in the same tissue. Preliminary evidence suggests that the parasite in C. pilosus may be infectious per os. The parasite of C. inornata forms haploid spores in the gastric caeca of late instar larvae. An asexual sequence in adult females leads to infection of developing eggs where diploid spores may be observed. The dimorphic microsporidium which was studied in Aedes taeniorhynchus is characterized by a fringed exospore and lack of an apparent pansporoblast membrane. This parasite is vertically transmitted for only a single generation. Therefore all other transmission must be horizontal. (Author)

AD-A093 961/1 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Military Effectiveness of Navy Men during and after Vietnam,
Anne Hoiberg. 1980, 18p Rept no. NAVHLTHRSCHC-79-13
Pub. in Armed Forces and Society, v6 n2 p232-246 1980.

No abstract available.

AD-A093 974/4 PC **A03**/MF **A01**
Army Inst. of Dental Research, Washington, DC.
The Effect of Immediate versus Delayed Dowel Space Preparation on Endodontically Filled Teeth.
Rept. for Jan-Jun 80,
Frank R. Portell, William E. Bernier, Lewis Lorton, and Donald D. Peters. Jan 81, 33p

This in vitro study evaluated the effect of immediate versus delayed dowel space preparation on the integrity of the apical seal. Twenty human teeth were obturated by lateral compaction of guttapercha and cement, and stored. Two weeks later, twenty more were similarly filled. Using hot endodontic pluggers, dowel spaces were prepared such that either 3mm or 7mm of apical fill remained. The specimens were treated in Ca(45)Cl2, horizontally sectioned and autoradiographs made. Analysis of the incidence and degree of microleakage showed that delayed dowel preparations significantly increased leakage (p=.01) if only 3mm of apical fill remained. (Author)

CEA-CONF-4669 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.
Use of RIA Tests for Screening and for Monitoring of Some Diseases.
M. Hegesippe. 1979, 24p CONF-7905162-4
Seminar on particle accelerators: utilization and radioprotection, Saclay, France, 14 May 1979.
U.S. Sales Only.

Some examples are described concerning the progress realized in the antenatal and neonatal diagnoses of congenital anomalies and in the follow-up of cancer patients using RIA techniques. The frequencies of some well known congenital abnormalities are recalled. The first example concerns Duchene myopathy. A second example, much more advanced, is the antenatal diagnosis of neural tube defects. A third example, already in routine state by state in north America and in Europe is the neonatal screening of congenital hypothyroidism. The last example concerns the use of CEA assay in the evaluation, the prognosis and the follow-up of cancer patient's state. These RIA examples were chosen to illustrate and also to situate the important place of this analytical response among informations available to the clinician. (Atomindex citation 11:521974)

FRNC-TH-710 PC **A07**/MF **A01**
Paris-11 Univ., Orsay (France).
Critical Study and Applications of the Radioimmunological Determination of Carcinoembryonic Antigen.
Solange Troupel. 1974, 132p
In French.Thesis.
U.S. Sales Only.

This paper outlines our research on the development of a radioimmunological method to determine the carcinoembryonic antigen of the digestive system (ACE). The carcinoembryonic antigen is defined and situated in the framework of antigens associated with human tumors. The general principles of the radioimmunological determination are then reviewed. A detailed technical study is devoted to each of the elements involved in the reaction and to the working conditions of each method tried. A labelling procedure and a radioactive protein separation method have been worked out, guaranteeing a high specific radioactivity consistent with a good immunoreactivity. The period of effectiveness of this protein has also been determined, taking account of its deiodination. The antiserum is a very important factor in the sensitivity of the measurement. A ewe antiserum of good antibody content and volume yield was chosen, its disadvantage being the length of the determination imposed by the 48 hour preincubation time. Ammonium sulphate precipitation and double antibody techniques were used for the labelled antigen-antibody separation. In seric solution the ammonium sulphate precipitation carries down nonspecifically, in the standards, a large amount of labelled antigen. This disadvantage has been offset by a method of calculation which shows the actual contribution of the labelled complex. The double antibody technique requires a special adjustment to balance quantity of second antiserum and precipitation time. The system sometimes needs an addition of serum from the animal donor of the first antibody in order to obtain an adequate separation. Where techniques are concerned, although the macro-method is suitable for determinations on perchloric extract and is still in common use we prefer to use the one described here under the name of micro-method. Finally the results obtained

in experimental and clinical applications are presented. (Atomindex citation 11:531318)

HRP-0900643/8 PC **A12**/MF **A01**
Visiting Nurse Association of Omaha, NE.
Development of a Problem Classification Scheme for Community Health/Public Health Nursing Services and Methodology for Its Use and a System Design for Its Computerization.
Final rept. 30 Sep 77-30 Sep 80,
Karen S. Martin, and DeLanne Simmons. 30 Sep 80, 270p
Contract PHS-HRA-231-77-0068

This report describes the second phase of a total project designed by the Visiting Nurse Association of Omaha to enhance effectiveness, accountability, documentation, and evaluation of community health nursing services. Thus, the total project has the potential to impact quality of care. The first phase involved nursing problems or nursing diagnoses and resulted in a problem classification scheme derived from empirical data. The second phase had two segments. During the first segment, the problem classification scheme was field tested in the following three agencies: the Des Moines (Iowa) Public Health Nursing Association; the Delaware State Department of Health and Social Services; and the Dallas (Texas) Visiting Nurse Association. Data analysis indicated that the scheme was acceptable and useful in diverse settings. The problem classification scheme was revised and incorporated into a manual (NTIS HRP-0501501) to facilitate implementation by others. During the second segment, pertinent literature was reviewed and a conceptual framework incorporating the nursing process was developed. Next, expected outcome-outcome criterion schemes were derived empirically and were pilot tested. Then, field tests were conducted at the Omaha agency and the same three collaborating agencies. Data analysis indicated a consistently high degree of concordance among and within test sites. Based on test data, the expected outcome-outcome criterion schemes were revised and refined. Then, the schemes were retested. Finally, the expected outcome-outcome criterion schemes were numerically coded to facilitate computerization. A preliminary design for computerization was developed to incorporate the products of the two phases, the problem classification, expected outcome, and outcome criterion schemes. The expected outcome-outcome criterion schemes have been used at the Visiting Nurse Association of Omaha since May 1980.

HRP-0902650/1 PC **A04**/MF **A01**
Central California Health Systems Agency, Visalia.
Project Review Procedures Manual.
23 May 79, 71p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This Project Review Procedures Manual describes the legal mandate given to the Central California Health Systems Agency (CCHSA) to perform reviews and delineates the procedures to be followed in conducting the required reviews. The Manual relates to two areas of review: (1) those reviews authorized under California Certificate Need Program (Health and Safety Code Section 437, et seq.) and Section 1513 (f) of Public Law 93-641 as amended (42 U.S.C. Section 300-2(f)); and (2) those reviews authorized under Section 1513 (e) of Public Law 93-641 (42 U.S.C. Section 300-2(e)) regarding Proposed Uses of Federal Health Funds. As CCHSA assumes new review responsibilities, appropriate changes or additions will be made to the adopted Manual. Any such changes or additions also will be subject to public comment and approval by the CCHSA Governing Body.

HRP-0902658/4 PC **A08**/MF **A01**
California Office of Statewide Health Planning and Development, Sacramento.
California Allied Health Occupations Project (CAHOP).
Final rept. 26 Jun 79-25 Jun 80,
Dale Houghland. Jul 80, 173p
Contract PHS-HRA-232-79-0034
Portions of this document are not fully legible.

The California Allied Health Occupations Project (CAHOP) was designed to alleviate the maldistribution of allied health personnel in medically underserved areas in 32 primarily rural counties in Northern California. The methodology employed was first to identify job vacancies in these areas; second to encourage qualified allied health job seekers to register with the program, and third to refer these applicants to jobs, provide follow-up and determine placement. Identifying job vacancies involved developing close liaison with hospitals; nursing homes; clinics; home health agencies; and county, State and federal health programs; to list job orders with the program. Encouraging allied health job seekers to register with the program included staff presentations at allied health training schools and military bases, participation in career days and health fairs, and extensive promotion of the free job referral service through the media, professional associations, State licensing boards, the State employment service, and other relevant agencies.

HRP-0902660/0 PC **A16**/MF **A01**
California Univ., San Francisco.
Non-Family Medicine Resident Training for Primary Care: A Comparative Evaluation of Federally and Non-Federally Supported Primary Care Oriented Medical Residency Programs.
Final rept. 1 Jul 78-30 Jun 80,
Edwin F. Rosinski, and Fred Dagenais. 1980, 359p
Contract PHS-HRA-232-78-0115

In the early 1970's, the Robert Wood Johnson Foundation and the Federal Government embarked on supporting nonfamily medicine residencies in primary care. A study was undertaken of these first sixteen residencies to determine if (1) there was any significant difference between the Foundation and Federally supported programs, and (2) what conclusions and recommendations could be drawn regarding residency training for primary care. The study utilized detailed questionnaires and site visits to interview approximately 350 individuals involved in the residency programs. The study focused on problems encountered in starting and continuing the programs, the programs' objectives, the kinds of clinical affiliations used, staffing patterns, the background of the residents, the patient population served by the programs, a description of the programs, the kind of patient care and educational activities in which the residents engaged, evaluation of the programs, patterns of funding, and finally what was being done to 'institutionalize' them.

HRP-0902685/7 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Is Your Health Plan Readable. Try Readability Testing,
Vivian Lin. 1980, 10p TECHNICAL ASSISTANCE MEMO-47
Contract PHS-HRA-232-79-0037

The HSA and SHPDA plans are often criticized as 'unreadable'. The reasons for such comments are varied, ranging from poor organization to poor display of data to poor prose. In this T.A. Memo, readability is discussed from the viewpoint of level of difficulty. Use of readability tests are illustrated.

HRP-0902686/5 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Achieving Planning and Regulatory Goals Through Relationships with Business,
George Smith. 1980, 9p TECHNICAL ASSISTANCE MEMO-48
Contract PHS-HRA-232-79-0037

Individual businesses and business organizations can be instrumental in assisting Health System Agencies to achieve their planning and regulatory goals. This paper describes general techniques for developing common interests with businesses and business organizations and strategies for plan implementation utilizing the power and resources of business and industry.

HRP-0902687/3 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Use of Health Status Indicators in Health Planning,
Anna Wu. 1980, 10p TECHNICAL ASSISTANCE MEMO-52
Contract PHS-HRA-232-79-0037

The National Health Planning and Resources Development Act of 1974 (P.L. 93-641) requires HSAs to assess the health status of their area populations. Although numerous health status measures have been devised, the conceptual difficulty in health status measures, the lack of suitable data on a regional level and the limitations of HSAs present themselves as major obstacles. There is a need for data on a regional level for local planning and further commitment and assistance from the national level to provide guidelines and standards for health status measures. Under present contraints, HSAs will have to work with less precise methods and limit the scope of health status indicators to be assessed and monitored.

HRP-0902690/7 PC **A02**/MF **A01**
Northern Indiana Health Systems Agency, Inc., South Bend.
Criteria and Standards for Hospice Services.
23 Apr 80, 19p
Grant PHS-05-P-000212-05-1

The development of these Criteria and Standards for Hospice Services has involved an effort spanning six months, numerous Panel meetings, and many hours of hard work. The Panel has made a conscientious attempt to provide for reasonable and equitable norms pertaining to hospice services. The health planning mechanism created under the National Health Planning and Resources Development Act (P.L. 93-641) as amended by P.L. 96-79 establishes the general public as partners to health care professionals in the process of shaping the health care system. Documents such as these Criteria and Standards provide an important decision-making framework for those who do not have practical experience in the design, organization, and operation of clinical service departments. These Criteria and Standards, in essence, pose the questions which should be asked with respect to a hospice service proposal, and suggest the qualitative or quantitative answers which should be expected.

HRP-0902691/5 PC **A05**/MF **A01**
Maine Dept. of Human Services, Augusta. Div. of Research and Vital Records.
Maine Vital Statistics 1978.
Statistical rept. (Annual).
1978, 83p

This report contains a summary of the Vital Statistics of the State of Maine for the calendar year of 1978. Births are tabulated for each county and all minor civil divisions and deaths are tabulated for each county and 45 selected minor civil divisions.

HRP-0902693/1 PC **A03**/MF **A01**
PROJECT SHARE (HHS), Rockville, MD.
Adolescent Pregnancy. Human Services Bibliography Series.
Oct 80, 46p

The annotated citations in this bibliography present an overview of articles, monographs, and government publications concerned with adolescent pregnancy. Materials included were published between May 1975 and January 1979. Emphasizing approaches, program development, and services, this bibliography is designed for the social service professional who plans and develops services for both the pregnant adolescent and the teenage father. The 48 citations are arranged alphabetically by first-named author. An alphabetic list of all personal and corporate authors and an index of titles are included.

HRP-0902694/9 PC **A05**/MF **A01**
Alpha Center for Health Planning, Bethesda, MD.
A Health Planner's Guide to Planning and Reviewing Alcoholism Services: Selected Readings,
Alan Bayer. 1 Oct 80, 95p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The recognition of the influence alcoholism has on the total health sector has been codified by the 1979 amendments to the health planning act (P.L. 96-79) which now requires health planning agencies to address alcoholism. This document contains research, planning techniques, and opinions

selected to inform planning agencies about some of the issues involved in alcoholism planning. It provides some suggestions on bed-to-population formulas and certificate of need criteria. Other aspects of planning for and reviewing of alcoholism services are discussed, including the following: coordination between planners and state alcohol authorities; estimation of prevalance; bed planning; the role of the general hospital; efficacy of modes of treatment; and calculation of costs. Because alcoholism is the cause of much of the health care utilization in this country, planning efforts in this area can yield substantial results in terms of cost containment and elimination of excess beds.

HRP-0902698/0 PC **A05**/MF **A01**
Georgia-Tennessee Regional Health Commission, Chattanooga.
Annual Implementation Plan for 1980-1981. Health Service Area 3 Tennessee.
17 Jan 80, 87p
See also HRP-0902256 and HRP-0902699. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Annual Implementation Plan describes desired activities in the health system which will further achievement of goals established in the Health Systems Plan. These actions are community and Health Commission actions to be achieved in the coming year. The AIP may also identify priorities among the objectives. In addition to the short-range objectives, the AIP describes actions recommended for achieving the objectives and identifies the entities within the health system responsible for carrying out these actions. The AIP also attempts to provide estimates of the resources required to implement the recommended actions and discusses the benefits which may result from achievement of the short-range objectives.

HRP-0902699/8 PC **A23**/MF **A01**
Georgia-Tennessee Regional Health Commission, Chattanooga.
Health Systems Plan for 1979-1984. Health Service Area 3 Tennessee. 3rd Edition.
11 Oct 79, 532p
See also HRP-0902698. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The purpose of the HSP is to describe and promote at the local level comprehensive health systems which will foster a healthful environment, reduce the risk of illness and injury, support the maintenance of optimal physical and mental health, and assure the accessibility of high quality health services in a manner which provides continuity of care, at a reasonable cost, for all residents of the area.

HRP-0902700/4 PC **A03**/MF **A01**
Health Resources Planning and Development, Inc., Camp Hill, PA.
Annual Implementation Plan for 1980. Health Service Area 4 Pennsylvania.
1980, 32p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0901608 and HRP-0902701.

Health Resources Planning and Development has selected the following short-range objectives to be implemented during the next program year of May, 1980, to April, 1981. These objectives, based on recommended actions contained in the Health Systems Plan (HSP), are listed according to priority. The recommended actions and resource requirements needed to carry out these objectives are also included. The Annual Implementation Plan (AIP) is meant to be a community action plan; thus, organizations aside from Health Resources Planning and Development have most of the responsibilities for implementing the short range objectives. The Health Systems Plan contains more objectives and recommended actions that could be completed during the next program year.

HRP-0902701/2 PC **A16**/MF **A01**
Health Resources Planning and Development, Inc., Camp Hill, PA.
Health Systems Plan for 1980. Health Service Area 4 Pennsylvania. 3rd Edition.
1980, 368p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0902700.

The report is Amendments to the 1979 Health System Plan of South Central Pennsylvania. These amendments were developed by planning subcommittees of H.R.P.D. and were subjected to public hearing, public written comment, discussion and action by the Planning Committee and Board of Directors of H.R.P.D.

HRP-0902702/0 PC **A05**/MF **A01**
Health Planning Association of the Central Ohio River Valley, Cincinnati.
Annual Implementation Plan for 1980. Health Service Area 1 Ohio.
1980, 98p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0902703 and HRP-0901614.

The AIP outlines specific actions to be taken by community entities (other than the HSA) in the area's health system within the following year (January 1, 1980 through December 31, 1980). As such, it is the HSA's annual expression of the desired changes the community wishes to see in its health care system. AIP objectives (which are short range) are tied directly to priority HSP goals and objectives (which are long range in nature). AIP objectives represent just those specific actions to be taken in one year's time, in relation to the long range HSP priority goals and objectives. Consequently, the AIP objectives reflect what progress the community desires to make towards achievement of their long-range priority goals within the coming year.

HRP-0902703/8 PC **A99**/MF **A01**
Health Planning Association of the Central Ohio River Valley, Cincinnati.
Health Systems Plan for 1980. Health Service Area 1 Ohio. 3rd Edition.
Final rept.
Sep 79, 700p
Grant PHS-05-P-000238-04-0
See also HRP-0902702.

The Health Planning and Resource Development Association of the Central Ohio River Valley, Inc., (CORVA) was conditionally designated on May 1, 1976 and fully designated on May 1, 1977. In fulfilling its role as a health systems agency, CORVA is requried to establish a health systems plan (HSP) which is an articulation of desired achievements in both the health status of the area residents and the health care delivery systems which serve the area residents. This document is the third update of CORVA's first HSP.

HRP-0902716/0 PC **A07**/MF **A01**
Association of State and Territorial Health Officials, Washington, DC. National Public Health Program Reporting system.
Inventory of Programs and Expenditures and Uses of 314(d) Funds by State and Territorial Health Agencies, Fiscal Year 1979.
Aug 80, 137p ASTHO-NPHPRS-PUB-55

This is the eighth annual publication of the Inventory of Health Programs from data of the National Public Health Program Reporting System. A comprehensive report on services, expenditures, funding sources, programs and responsibilities of state and territorial health agencies is also available. The National Public Health Program Reporting System was initiated by the Association of State and Territorial Health Officials has been designated as the uniform national reporting system specified in Section 314(d) of the Public Health Service Act. This reporting system provides comprehensive and uniform data concerning public health programs of state and territorial health agencies on a national basis. Central costs have been supported by a contract with the Public Health Service, Department of Health and Human Services. State and territorial health agencies have contributed staff liaison reporting services and consultation on a voluntary, cooperative basis.

HRP-0902720/2 PC **A14**/MF **A01**
Northern Indiana Health Systems Agency, Inc., South Bend.
Annual Implementation Plan for 1980. Health Service Area 1 Indiana.
1980, 316p
Grant PHS-05-P-000212-04-1
See also HRP-0902721 and HRP-0902722.

The Annual Implementation Plan (AIP) is a statement of the actions proposed to address priority health problems in the first year of the long-range five-year Health Systems Plan (HSP). Its structure ensures that short-range recommended actions and resource requirements (or implications) are spelled out in terms of personnel, facilities, equipment and financing. The AIP objectives and their short-range recommended actions have been derived from HSP objectives and recommended actions. These derivations facilitate a logical flow of needs, goals, objectives, recommended actions and resource requirements.

HRP-0902721/0 PC **A99**/MF **A01**
Northern Indiana Health Systems Agency, Inc., South Bend.
Health Systems Plan for 1980. Health Service Area 1 Indiana. 3rd Edition.
1980, 760p
Grant PHS-05-P-000212-04-1
See also HRP-0901333, HRP-0902720 and HRP-0902722.

The Health Systems Plan provides a basis upon which the Northern Indiana Health Systems Agency can promote a healthful environment, review proposed health system changes, reduce documented deficiencies and inefficiencies within the area, and promote desired achievements which meet identified needs of the community.

HRP-0902722/8 PC **A05**/MF **A01**
Northern Indiana Health Systems Agency, Inc., South Bend.
Health Systems Plan for 1980. Health Service Area 1 Indiana. Summary.
1980, 96p
Grant PHS-05-P-000212-05-1
See also HRP-0902720 and HRP-0902721.

Summary of NIHSA Plans has been prepared to provide interested members of the public with a concise overview and guide to A Health Systems Plan for Northern Indiana and An Annual Implementation Plan for Northern Indiana. This summary will assist the public in learning more about the Northern Indiana Health Systems Agency, Inc. and its activities and goals for improving the health of northern Indiana residents. This summary provides a concise guide to the goals and objectives requiring priority action. The document is not intended to thoroughly describe the health status of area residents or the health system of northern Indiana. The detailed analyses, rationales, alternative actions, and resource requirements of the parent documents are not provided in the summary. Therefore, refer to the complete plans for an in-depth treatment of the facts, issues and problems related to each goal.

INIS-mf-5730 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Applicatons of Accelerators.
J. S. Fraser. May 79, 13p CONF-7906178-1
Canadian Association of Physicists annual congress, Vancouver, Canada, 18 Jun 1979.
U.S. Sales Only.

The great diversity of possible applications of accelerators has been demonstrated in the past few years. Apart from the more familiar uses of accelerators for fundamental particle, nuclear, and solid state physics research, the applications range from microscopic trace analysis through cancer therapy to nuclear power and large volume radiation processing. Accelerators are also being used for applied research in proton radiography, radiation damage studies, laser excitation and materials analysis. The required beam properties vary from an extremely low emittance with very low beam current to megawatt beam power with a low level of beam spill. At the Chalk River Nuclear Laboratories developments are underway on applications of accelerators to nuclear fuel breeding and to cancer therapy. (Atomindex citation 11:528402)

N81-15658/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Bulgarian Contributions to the Development of Space Biology and Medicine.
K. Serafimov. Aug 80, 12p NASA-TM-76289

Contract NASW-3199
Transl. Into English from Bulgariya I Kosmosut, 1979 p 93-100; Publ. By Narodna Publishing House, Sofia. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Several aspects of aerospace medicine are discussed. Particular attention is given to the following: the effects of anoxia; the effects of positive radial acceleration; and the effects of various degrees of athletic conditioning and drugs on the tolerance of space flight factors.

N81-15662/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Unification of Some Biochemical Methods of Research in the Pre- and Post-Flight Periods.
R. A. Tigranyan. Dec 80, 8p NASA-TM-76466
Contract NASW-3199
Transl. Into English of "Unifikatsiya Nekotroykh Biokhimicheskikh Metodov Issledovaniy V Pred- I Poslepoletnom Periode' Rept. Moscow, 1980 p 1-7. Transl. By Kanner (Leo) Associates Redwood City., Calif. Original DOC. Prep. By Ministry of Health USSR, Moscow. Presented at 11TH Joint Soviet-American Working Group on Space Biology and Medicine, Moscow, Oct. 1980 1-7.

The biochemical methods for determination of various parameters and factors during pre- and post-flight periods, as used by American and Soviet teams dealing with space flight medicine are compared. The emphasis is on the exchange of information on the study of the blood and urine content of space travelers before and after space flight. A series of electrolytic, enzymatic, and hormonal factors is discussed.

N81-15672/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Electrostimulation of Muscles as a Method for the Treatment and Prophylaxis of Hemodynamic Disturbances During Prolonged Hypokinesia.
Y. O. Dukhin, and L. Y. Zhukovskyy. Sep 80, 12p NASA-TM-76318
Contract NASW-3199
Transl. Into English from Visn. Akad. Amuk. USSR, No. 10, 1979 p 48-54. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Hemodynamic and periopheral circulation indexes were recorded before, at the end of, and 5 days after 10 days of electrostimulation for 45 min daily, at rest and after a physical loading test. It was found that stroke and minute volume, cardiac output, and regional circulation improved and heart rate and peripheral resistance decreased. The functional state of the cardiac muscle and vascular tone are improved by electrostimulation of selected groups of skeletal muscles.

N81-15676/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Comparative Assessment of Prognosis of the Stop Stimulus and Trapezoidal Rotation Programs.
V. K. Grigorova, V. K. Popov, and V. S. Todorova. Sep 80, 9p NASA-TM-76336
Contract NASW-3199
Transl. Into English from Vestn. Otorinolaringologii (Bulgaria), No. 2, Mar. - Apr. 1980 p 30-33. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Bulgarian Acad. Of Sci., Sofia.

For prognosis of the diagnostic possibilities of the stop stimulus and trapezoidal rotation programs with respect to the nystagmus response, 24 healthy young persons with normal auditory and vestibular analysers were studied experimentally. The trapezoidal program more accurately reflects the function and tone balance of the vestibular system than the stop stimulus program and causes the subject no unpleasant sensations during the study. Some optimum coupies, acceleration and armchair rotation rate, necessary for effective deviation of the cupuloendolymphatic system were determined. The maximum angular velocity of the slow nystagmus component was more informative than nystagmus duration. The trapezoidal program is recommended for otoneurological practice and the maximum angular velocity of the slow nystagmus component as the basic index.

N81-15677/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Assessment of Oxygen and Carbogen Therapy Effect in Meniere's Disease According to Clinical and Electroencephalographic Data.
A. B. Boronoyev. Sep 80, 14p NASA-TM-76348
Contract NASW-3199
Transl. Into English from Zh. Ushnykh, Nosovykh I Gorlovykh Bolezney (USSR), No. 3, May - Jun. 1978 p 72-78. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By the Leningrad Sanitary Hygiene Medical Inst., USSR.

The method of constructing fields on the basis of EEG data gives a quantitative characterization of bioelectrical activity. Fields of average rates of the change of potentials in healthy people have a well defined configuration, where the greatest rates are found in the occipital zones, lower in the frontal and parietal, and least in the temporal zones. In response to functional loads the form of the field remains the same because of a synchronous change in the average rates in both hemispheres of the cerebrum to the same extent. The configuration of the fields of background bioelectric activity of the cerebrum in people with Meniere's disease is not uniform. On the basis of this investigation, a clear correlation was found between the subjective sensations of patients during oxygen and carbogen therapy and the changes in the spatial characteristics of the field of potentials of the cerebrum. This correlation makes it possible to objectively identify the nature of the vascular disturbances in Meniere's disease, develop a pathogenetic treatment plan, and evaluate its effectiveness.

N81-15679/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Orthostasis Test in the Practice of the Cardiologist.
N. P. Moskalenko, and M. G. Glezer. Sep 80, 14p NASA-TM-76324
Contract NASW-3199
Transl. Into English from Kardiologiya (USSR), V. 19, No. 11, 1979 p 112-116. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The orthostasis test makes it possible to evaluate neurohumoral regulation and reaction of the circulatory system and to detect changes in the function of a number of internal organs (especially the kidney). Simultaneous recording of the ECG in an orthostatic position despite nonspecificity, makes it possible to detect hidden damage (organic or metabolic) or increased sensitivity of the myocardium to stressor sympathetico-adrenal effects, stability of therapeutic effect, and the action mechanism of a number of drugs.

PB81-136913 PC **A23**/MF **A01**
Actuarial Research Corp., Falls Church, VA.
The Rising Cost of Catastrophic Illness.
Final rept. 26 Jun 75-11 Jul 77,
Gordon R. Trapnell, and Frank E. McFadden.
Dec 77, 532p NCHSR-81-15
Contract PHS-HRA-230-75-0143
See also PB81-136905.

The purpose of this research is to develop time series analyses of catastrophic illness (CI). The results should provide a basis for understanding the increasing cost of treating major illnesses, provide a profile of the changes in spending for CI by its principal causes, and show the contribution of major diseases categories to these trends. The results should also have major implications for public policy, by providing a basis for estimating the rate of increase in the cost of catastrophic provisions of health insurance plans, including those in proposed national health insurance programs.

PB81-141665 PC **A08**/MF **A01**
Missouri Univ.-Columbia.
End Stage Renal Disease (ESRD): Resource Forecasting by Predictive Model; Executive Summary and Final Report.
Final rept. 30 Sep 79-31 Dec 79,
Arthur E. Rikli, and Michael S. Leonard. Dec 79, 172p NCHSR-81-49
Grant PHS-HS-03287

To assist health planners anticipate the number of end stage renal disease (ESRD) patients who will require governmentally-sponsored health services, the project team developed models to forecast future patient census and resource requirements. These models, based on a selection of population states whose membership could be mathematically manipulated through time, were developed with the cooperation of Missouri-based health agencies responsible for ESRD planning and review and were extensively tested against historical state and national data. Model forecasts, although subject to error, demonstrated the feasibility of using such forecasting devices in local ESRD planning. The team also examined potential benefits of the use of advanced models for more refined forecasts of ESRD patient care delivery system requirements.

PB81-149155
(Order as PB81-149148, PC **A05**/MF **A01**)
Shanghai First Medical Coll. (China). Huashan Hospital.
Preliminary Report on Clinical Monitoring of Intracranial Pressure,
Shi Yuquan, Jiang Dajie, Zhou Fanmin, and Yuan Shiyi. Dec 80, 6p
Included in Chinese Medical Jnl., v93 n12 p809-814 1980.

Intracranial pressure (ICP) monitoring in 20 neurosurgical patients with locally made monitoring apparatus is reported. The data include continuous recording of intraventricular fluid pressure in 11, epidural pressure in 8 and subdural pressure in 1. In the 3 in which integrity of the epidural space had been spoiled by skull fracture or craniotomy, modified Vries method failed to record epidural pressure for monitoring. In another 3 in which the epidural space was intact, this modified Vries method of monitoring epidural pressure was successful, but marked damping effect prevented long term monitoring. A miniature pressure transducer is indispensable in monitoring epidural pressure.

PB81-149163
(Order as PB81-149148, PC **A05**/MF **A01**)
Hunan Medical Coll., Changsha (China).
Experimental Research on Artemisia Decoction and General Attack Therapy in Cholelithiasis,
Yu Zhongfu, and Guo Zhaogui. Dec 80, 8p
Included in Chinese Medical Jnl., v93 n12 p815-822 1980.

This article deals with the determination of the normal values and ranges of bile flow, bile content and Oddi's sphincter tension in 33 anesthetized dogs and Yinchen dandao tang (artemisia decoction or AD) action on these biliary tract parameters. Mainly a hydrocholerectic agent, AD intravenous injection is markedly effective in facilitating bile flow and reducing bile solids content. Moreover, it has obvious relaxing action on morphine caused Oddi's sphincter spasm. The experimental results provide a preliminary experimental basis for the treatment of cholelithiasis by combined traditional Chinese and western medicine as well as elucidating the therapeutic principles of Chinese medicine. The problems of rational use of morphine in combined traditional Chinese and western medicine therapy for cholelithiasis are discussed.

PB81-149171
(Order as PB81-149148, PC **A05**/MF **A01**)
International Children's Centre, Paris (France).
Bilateral Diaphragmatic Hernia Due to Blunt Trauma; a Case Report,
Wang Enyu. Dec 80, 4p
Included in Chinese Medical Jnl., v93 n12 p823-826 1980.

A case of bilateral diaphragmatic hernia due to blunt trauma with clinical manifestations similar to those of cardiac tamponade was treated successfully by bilateral thoracotomy and laparotomy. Two types can be distinguished: (1) True bilateral diaphragmatic hernia; (2) bilateral diaphragmatic hernia of pericardio-diaphragmatic type. The mechanism of nonpenetrating traumatic diaphrag-

matic hernia is discussed. Early diagnosis and prompt surgery are emphasized.

PB81-149189
(Order as PB81-149148, PC **A05**/MF **A01**)
Beijing Inst. of Ophthalmology (China).
Pathogenesis of Trachoma,
Jin Xiuying, Zhang Xiaolou, Zhang Wenhua, Wang Xianglan, and Sun Xianli. Dec 80, 8p
Includedd in Chinese Medical Jnl., v93 n12 p827-834 1980.

The pathogenesis of trachoma is discussed including the conjunctival cytology, follicular pathology and chiamydial toxin pathogenic action on human eyes. It is believed that the toxin is the main factor in producing the acute symptoms. Proliferative inflammation runs a chronic course and repeated infections induce delayed hypersensitivity. The severity of the morbid condition is related closely to host immunologic status against Chiamydia. Severe trachoma represents immunopathologic changes after repeated infections. The key to prevention and treatment of trachoma lies in energetic treatment of acute cases and exacerbated cases and control of transmission. In treating severe trachoma cases with active pannus, corticosteroids should be added to the antichiamydia drugs.

PB81-149197
(Order as PB81-149148, PC **A05**/MF **A01**)
Chinese People's Liberation Army Fourth Military Medical Coll., Chongqing. Dept. of Pathology.
HBcAg in Hepatocellular Carcinoma and Its Surrounding Tissue,
Wang Wenliang, Wang Boyun, Zang Jianshen, Liu Wenbo, and Liu Yanfang. Dec 80, 8p
Included in Chinese Medical Jnl., v93 n12 p835-842 1980.

Hepatitis B virus core antigen (HBcAg) and its antibody (anti-HBc) in hepatocellular carcinoma and its surrounding tissue are detected by the immunofluorescence and immunoperoxidase methods. All specimens were obtained by biopsy, formalin-fixed and paraffin-embedded. Among the 86 cases of hepatocellular carcinoma, positive HBcAg or anti-HBc was found in sections stained by both methods in 10, of which 8 were positive in the cancer cells and 5 in the surrounding liver cell tissue. Most of the positive nuclei were HBcAg positive with a small proportion of anti-HBc positive also. In the cancer and liver cells positive reactions were mainly in the nuclei. The cytoplasm of 5 cases and nucleoli of 2 were also positive. Considering the presence of both HBcAg and HBsAg in hepatoma cells, the possibility of direct hepatitis B virus (HBV) effect was suggested.

PB81-149205
(Order as PB81-149148, PC **A05**/MF **A01**)
Zhejiang Medical Coll., Hangzhou (China). Second Affiliated Hospital.
Screening and Prevention of Colorectal Cancer in Haining County,
Zhang Shiqin, Zhu Shixin, and Wu Jinmin. Dec 80, 6p
Included in Chinese Medical Jnl., v93 n12 p843-848 1980.

From September 15, 1977 to April 15, 1978 450,477 persons over the age of 7 were screened for schistosomiasis and 198,950 over the age of 30 were screened for colorectal cancer. 75 cases of colorectal malignant tumor were discovered, a positive rate of 37.69/100,000 (7 were colonic cancer, 14 rectal cancer, 20 polyp with cancerous change and 34 carcinoid). 2,701 had various types of polyps and 5,242 definitive diagnostic schistosomiasis. History, physical examination and occuli blood test are simple, useful methods for detecting late colorectal cancer but are of no value in preventive screening of early cases. Rectal finger examination is an important, effective method of diagnosing rectal cancer, but the positive rate is 1/10 that of rectoscopy. It can not be used for mass screening as the examiner's finger cannot tolerate such constant use and the finger is too short to discover higher placed tumors.

PB81-149239
(Order as PB81-149148, PC **A05**/MF **A01**)
Chinese Academy of Medical Sciences, Shanghai. Inst. of Parasitic Diseases.
Scanning and Transmission Electron Microscopy of Schistosoma Japonicum Egg Shell,
He Yixun, Gong Zuxun, and Ma Jinxin. Dec 80, 4p
Included in Chinese Medical Jnl., v93 n12 P861-864 1980.

The surface of the egg shell of Schistosoma japonicum appears quite rough by scanning electron microscopic (SEM) and extremely complicated in structure by transmission electron microscope (TEM). The shell is composed of a thin, very dense and apparently continuous inner layer and a thick and moderately dense outer layer. The outer surface of the egg shell is covered with numerous bristle-like microspicules, averaging 0.06 microns long and 0.02 microns in diameter on 1 square micron egg shell surface. Some spaced microspicule--like projection may also be found, averaging about l0.18 x 0.06 microns. The tops of these projections break and drop off.

PB81-149247
(Order as PB81-149148, PC **A05**/MF **A01**)
Beijing Medical Coll. (China). Third Teaching Hospital.
Anterior Route Intervertebral Disc Excision and Bone Grafting in Cervical Spondylitic Myelopathy,
Zhang Zhihu, Yin Huafu, Yang Keqin, Zhang Tanchen, and Dong Fangchun. Dec 80, 4p
Included in Chinese Medical Jnl., v93 n12 p865-868 1980.

The article presents an analysis of 87 cases of cervical spondylitic myelopathy treated by anterior route excision of the disc and fusion who were followed at least more than half a year, averaging 22 months. The results were: 97.7% had no aggravation of symptoms or signs, 89.6% improved and 75.3% resumed work. Severe cases of cervical spondylitic myelopathy can be benefited greatly by operation and surgery should not be given up lightly. Autografts yield higher fusion rates and better results than homografts. Selection of the number and level of discs excised depends on the clinical signs, the X-ray, the myelogram and the amount of fluid injected into the discs.

PB81-150062 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Inst. for Biomedical Engineering.
Evaluation of the Relationships between Taste Acuity and Zinc Tissue Levels.
Final rept.,
Elisabet Atkin-Thor, Joan Eggert (O'Nion), Suzanne Ogilvie, Robert L. Stephen, and W. J. Kolff. 16 Jul 80, 21p
Contract N01-AM-7-2211

Over the last 3 years the zinc status of 35 patients with non-diabetic end stage renal disease on hemodialysis and 15 patients with decreasing renal function, not yet on dialysis, have been studied. Marked depletion of serum, red cell and hair zn was found in the majority of the dialysis patients. In addition to normalizing the laboratory parameters zinc supplementation significantly improved the taste acuity and the protein and caloric intakes. Also a statistically significant improvement in urea generation rate was noted. 3 patients continued on long term zn supplementation, causing symptoms of zinc toxicity and extra and intracellular zinc values above normal. A significant correlation between time period without zinc supplementation and declining serum and RBC zinc was found. The patients studied in progressive renal failure had inadequate caloric, protein and zinc intake. There was no correlation between proteinuria and zinc secretion or proteinuria and serum and RBC zinc values. The sample size was too small to find any correlation between etiology of renal failure and zinc deficiency and between degree of renal failure and zinc deficiency.

PB81-150849 PC **A05**/MF **A01**
National Asthma Center, Denver, CO.
Development and Evaluation of Self-Management Systems for Children with Asthma.
Final rept. 26 Sep 77-25 Dec 80,
Thomas L. Creer. 25 Dec 80, 96p NIH-N01-HR-7-2972
Contract N01-HR-7-2972
Prepared in cooperation with Ohio Univ., Athens. See also report dated 1 Oct 80, PB81-119430.

This report describes the development and application of a self-management system for bronchial asthma. It was tested with almost 400 patients, mainly children, and their families. The general finding was that application of the system did teach patients to manage their asthma. This was repeatedly reflected on a number of dependent measures used on the project. In addition, application of self-management techniques was demonstrated to reduce health care costs and school absenteeism attributable to asthma.

PB81-151250 PC **A04**/MF **A01**
Departamento Nacional de Producao Vegetal, Brasilia (Brazil). Div de Defesa Sanitaria Vegetal.
Prevencao de Acidentes no Uso de Defensivos (Prevention of Accidents in the Use of Preservatives),
Dario Monteiro Galvao. 1980, 68p

This document begins by defining the term 'preservatives' or fitosanitary products, which include chemicals and biological or living organisms destined to prevent, destroy, attract or repel any agent, malignant to plants. Analysis types, care, storage, transportation, and instructions in case of emergencies are also discussed. The report includes international trade marks also used in Brazil and lists of fungicides, herbicides and acaricides in alphabetical order.

PB81-151334 PC **A10**/MF **A01**
Health Care Financing Administration, Washington, DC.
The Effect of a Mandatory Second Opinion Program on Medicaid Surgery Rates - An Analysis of the Massachusetts Consultation Program for Elective Surgery,
Suzanne Grisez Martin, Michael Swartz, Deborah D'Apra Cooper, Anne E. McCusick, and John H. Thorne. Oct 80, 222p HCFA-78-6
Sponsored in part by Massachusetts Dept. of Public Welfare, Boston.

This study examines the first year impact of a mandatory second surgical opinion for Medicaid enrollees in the State of Massachusetts. Enacted by the Massachusetts State Legislature in 1976, the program requires all Medicaid beneficiaries recommended for any one of eight designated elective procedures to get a second opinion before undergoing surgery. Although obtaining the second opinion, patients were free to decide whether to have surgery regardless of the consultants advice. The procedures covered were tonsillectomy/adenoidectomy, menisectomy, hysterectomy, cholecystectomy, submucuous resection, spinal fusion/disc surgery, hemorrhoidectomy, and excision of varicose veins. The report indicates that the program resulted in a 20% decline in surgery rates for the eight procedures in the year following program implementation. After accounting for alternate medical and surgical treatment, the estimated net cost benefit ratio was 1:3:9. The surgery decline was in part due to a sentinel effect--that is physicians proposed less surgery--and in part to patient's decisions based on the second and, in some cases, a third opinion.

PB81-151482 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
Factors Which May Precipitate Unsuccessful Nursing Care Referrals,
Evelyn F. Kacavas. Jun 71, 68p VA/NPR-59

The problem under study was the identification of a group of factors which may have contributed to unsuccessful nursing care referrals. The objectives of the study were to identify and describe: omission or weakness in planning for nurse referrals; weakness in quality and quantity of communication between hospital and the Visiting Nurse Association; areas in which the Nursing Referral Manual could be improved; referred patient problem areas; referring nurse problem areas; and Visiting Nurse problem areas. The literature review and data analysis revealed several factors which possibly might have precipitated unsuccessful referrals. For example, public health nurses attitude

and patient preparation for referral. The findings indicated substantiation for the factors identified in the literature review as well as the other factors: such as, lack of meaningful communication, vague interpretation of the nursing role, and unplanned planning for referral.

PB81-151607 PC **A04**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Biomedical Research, Development, and Engineering at the Johns Hopkins University Applied Physics Laboratory.
Annual rept. 1 Dec 79-30 Sep 80,
J. Bohandy, B. F. Kim, M. H. Friedman, R. A. Meyer, and R. H. Andreo. Nov 80, 63p JHU/APL/MQR/80
Contract N00024-78-C-5384
See also report dated Oct 79, PB80-175268.

The Medical Institutions of The Johns Hopkins University and The Johns Hopkins University Applied Physics Laboratory have developed a vigorous collaborative program of biomedical research, development, and systems engineering. An important objective of the program is to apply the expertise in engineering, the physical sciences, and systems analysis acquired by APL in defense and space research and development to problems of medical research and health care delivery. This program has grown to include collaboration with many of the clinical and basic science departments of the medical divisions. Active collaborative projects exist in Biophysics, Ophthalmology, Neurosensory Research and Instrumentation Development, Cardiovascular Systems, Patient Monitoring, Therapeutic and Rehabilitation Systems, Clinical Information Systems, and Clinical Engineering. This application of state-of-the-art technology has contributed to advances in many areas of basic medical research and in clinical diagnosis and therapy through improvement of instrumentation, techniques, and basic understanding.

PB81-151706 PC **A03**/MF **A01**
Massachusetts Univ., Amherst.
Preventive Medicine: A Systematic Approach,
David A. Lewis. Jul 80, 28p
Paper presented at the International Symposium of Engineering (3rd) held at the Universidad Centroamericana Jose Simeon Canas on 25-30 July 1980. Prepared in cooperation with Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).

The paper describes the advantages of adding preventive services into medical practice. Educational programs are systematically analyzed and justified. Variables addressed include cost, patient satisfaction, and patient health. A survey of preventive service available--mass screening, immunization, health education, self care, problem oriented records, and activity checklists--are presented and analyzed in some detail. A pilot study was undertaken to determine the effectiveness of one of these techniques, activity checklists, on changing doctor's usage of preventive services which directly affects the quality of medical care received by the population as a hole. An explanation of the development of the preventive health care record, the design of the PHCR, and results of the systems usage are presented. The paper concludes with a discussion of how preventive medicine can help to satisfy the basic health care needs of developing countries.

PB81-155095 PC **A03**/MF **A01**
Veterans Administration, Washington, DC.
Job Design for Classified Nursing Service Personnel,
Suzanne S. Dziak. Sep 66, 49p VA/NPR-43

The purpose of the study project was to develop a job design for classified Nursing Service Personnel. Specifically the study was to determine whether or not a functional difference in the duties of the GS-3, and GS-4, nursing assistant; between the GS-3 and GS-4 Practice Nurse; between the GS-4 and GS-5 Practical Nurse; and between the practical nurse and nursing assistant. The preliminary exploration revealed a cause of the 'confusion' in utilization of the classified nursing service personnel. The conventional approach to job description did not reflect the abilities and skills required of the different levels of classified workers. There was evidence of a need for job clarification in the reality situation. The findings gave clues to the fact that the functions of classified nursing service personnel are similar, but that the difference is in the degree and level of participation in patient care.

PB81-155103 PC **A09**/MF **A01**
De Paul Univ., Chicago, IL.
Foreign Medical Graduates: Sources, Growth, Geographic Distribution and Locational Factors in Metropolitan Chicago, 1950 - 1974.
Executive summary (Final) 1 Jan 78-31 Dec 79,
Donald R. Dewey. Apr 80, 193p NCHSR-81-50
Grant PHS-HS-02916

This study describes and analyzes the changing geographic distribution and demographic characteristics of Foreign Medical Graduates (FMGs) within metropolitan Chicago over a twenty-five year period, 1950-1974. The study provides insights in understanding the impact of FMGs on health care within a large metropolitan area, helps to determine their personal characteristics and practice patterns, and establishes the principal factors influencing their location. The study includes a detailed description and analysis of the office location and characteristics of FMGs within a large metropolitan center in four time periods, 1950, 1960, 1970 and 1974. It also traces the rise in total number of FMGs and detailed information and analyses of FMGs by country of graduation, type of practice, specialty, and age characteristics. Furthermore, it examines each of these elements at four levels of geographic detail within the metropolitan area: (1) the metropolitan area as a whole, (2) city and suburbs, (3) concentric zones and radial sectors, and (4) urban neighborhoods (community areas) and suburban municipalities. Comparisons with downstate Illinois and national patterns are also included. This study further clarifies the nature of health manpower resources within metropolitan regions.

PB81-155343 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
Perception of the Communication Process As it Is Experienced by Selected Chiefs, Nursing Service in Their Relationship with the Medical Chief of Staff,
Helen C. Raissle. Apr 70, 72p VA/NPR-50

The purpose of this study was to delineate those factors which appeared in directing and administering a plan of action to achieve the objectives of Nursing Service. Axiomatic to the basic premise was the belief that the effectiveness of the communication process between the Chief, Nursing Service and Chief of Staff would influence the quality of nursing care which patients receive. The tool used for data collection was a twenty time open-end questionnaire which was submitted to 15 Chiefs, Nursing Service assigned to neuropsychiatric hospitals representing all geographical sections of the United States.

PB81-155616 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
Use of Beer with Geriatric Patients,
Beverly K. Hagemann. 1970, 5p VA/NPR-82

Their project tested the hypothesis that drinking beer has a positive effect on the behavior & well being of the severely incapacitated geriatric patient. The hypothesis was found to be true after 2 groups of patients were organized. One group was provided with beer & snacks, a second, control group with juice & snacks, they were allowed to socialize for 45 minutes 3 times weekly for 8 weeks. The fringe benefits resulting from this project were that certain patients no longer left the hospital with leave to go into town for beer and that the nurses were enlighted & quality of nursing care was improved.

PB81-155624 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
A Plan to Communicate with Nurses in Patient Care Areas,
Patricia Kane. Jun 71, 10p VA/NPR-58

This is a plan for the nurses in the patient care areas to discuss their program plans with the Nursing Service Executive Committee. The subject matter presented at these scheduled meetings is determined by the Unit nurses. Included in the suggested procedure is an outline of subjects to be discussed. The information obtained is recorded. The members of the Executive Committee can utilize this opportunity to meet with nurses in many ways. They can learn about patient treatment programs, personnel management, accomplishments, and goals of the Unit Team. The information obtained is compiled to be used as a reference for reports, Program Plans for Nursing Service, equipment needs, and other topics selected by the users.

PB81-155632 PC **A08**/MF **A01**
System Sciences, Inc., Bethesda, MD.
Evaluability Assessment of the Emergency Medical Services Programs.
Final rept.
31 Oct 80, 172p ASPE/ETA-79-7
Contract DHEW-100-79-0042

In conducting the evaluability assessment of the Emergency Medical Services (EMS) program, the evaluation team found that: (1) Agreement on the intended EMS program was found to exist. Varying degrees of emphasis both above and below the division of EMS were given to the perceived program objectives. In general though, three objectives were articulated: (a) the reduction of death and a disability due to emergency medial episodes (outcome objective); (b) development of a national network of financially viable EMS systems (outcome objective); (c) development through provision of federal 'seed monies'; and (d) system development and implementation (operational objective). (2) A program logic emerged which had as its foundation two primary causal assumptions: (a) developing EMS systems (operational objective) will lead to a reduction in death and disability and achievement of financial viability (outcome objective); (b) certain system activities relate more directly to the reduction in death and disability; the activities include: manpower and training, communications, transportation, facilities categorization and designation and development of protocols and agreements. A sizeable portion of the program ready for the evaluation of progress against agreed upon objectives.

PB81-155988 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
Use of Tape Recorder for Change of Tour Report on Nursing Units in a VA Hospital,
Jean M. Hansen. Jan 68, 14p VA/NPR-33

The primary purpose of this study was to determine the effect, if any, taped change of tour reports had upon the team approach to patient care on twenty-three nursing units at VA Hospital, Memphis, Tennessee. The study incorporated a review of literature; interviewing of educational, supervisory and administrative personnel; observation of change of tour reporting; a seven-day completion study on each nursing unit (483 change of tour reports); a questionnaire to head nurses and one to staff nurses. Nursing units involved were medical, surgical, spinal cord injury, pulmonary disease, and psychiatric. Results of the study indicate that taped reports can favorably contribute to the team approach to patient care when used with discrimination. The obvious disadvantage of possible lessening of direct personal communication and interaction must be taken into consideration. Advantages include the ability to listen to the materials as often as necessary; dissemination of information with varying individual interpretations and focusing of attention upon the subject under discussion. As long as the tape recorder, and its product, is regarded as a supplemental tool and used judiciously it can contribute to the team approach in Nursing Service.

PB81-156754 PC **A03**/MF **A01**
National Center for Health Services Research, Hyattsville, MD.
Nursing Home Costs: A Statistical Cost Function Analysis Using National Survey Data (Dissertation Executive Summary).
Final rept.,
Mark R. Meiners. Dec 78, 38p NCHSR-81-52

Multiple regression techniques are used to analyze a number of key determinants of nursing home costs. Variables measuring the amount of output the facility is capable of producing, the rate at

which capacity is utilized, the cost of factor inputs, the distinguishing features of the facility, the quality of the available services, and the characteristics of the residents served are specified using data from the 1973-74 National Nursing Home Survey. Findings shed light on a number of important nursing home cost topics including the most economical size of a nursing home, the implications of changes in the admission rate and the occupancy rate, the difference between proprietary and nonprofit nursing homes, and the effect of Medicare and Medicaid standards and reimbursement practices.

PB81-157844 PC **A13**/MF **A01**
National Inst. of Allergy and Infectious Diseases, Bethesda, MD.
New Initiatives in Immunology.
Jan 81, 287p DHEW/NIH/PUB-81-2215

This book was written and edited by experts in six selected fields of Immunology: Molecular Genetic Approaches to Immunologic Systems; Cloning of Immunocompetent Cells; Hybridoma Technology to Produce Monoclonal Antibodies and the Application of Monoclonal Reagents to Biology and Medicine; The Antigens of the Major Histocompatibility Complex and Their Biological Functions; Regulatory Mechanisms of the Immune Response; Effector Mechanisms and Mediators.

PB81-802282 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Rural Health Services. December, 1977-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 77-Dec 80.
Jan 81, 245p
Supersedes PB80-802184, and NTIS/PS-78/1212. See also February, 1976-November, 1977, NTIS/PS-78/1211.

Primary health care, health planning, health care delivery systems, health resources, health care facilities, legislation, costs, and manpower are the subjects covered. Also included are studies on education, telemedicine, ambulatory health care, and mental health care. The bibliography excludes reports on emergency medical services. (This updated bibliography contains 238 citations, 47 of which are new entries to the previous edition.)

PB81-802373 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Contraceptives and Birth Control. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 129p
Supersedes PB80-802002, and NTIS/PS-78/1268.

The bibliography contains selected abstracts which cover the clinical aspects of contraceptives and birth control as well as family planning. More specifically the topics covered include oral contraceptives, intrauterine devices, vasectomy, birth patterns, Government policies, and fertility. (This updated bibliography contains 122 citations, 13 of which are new entries to the previous edition.)

PB81-802399 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Epilepsy. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 123p
Supersedes PB80-802077, and NTIS/PS-78/1225.

The selected abstracts cover rehabilitation, diagnosis, electrophysiology, medical equipment, medical services, vocational guidance, and physical therapy as related to epilepsy. (This updated bibliography contains 116 citations, 10 of which are new entries to the previous edition.)

PB81-858581 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lipid Metabolism. January, 1970-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Nov 80.
Jan 81, 69p
Sponsored in part by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning lipid metabolism as it relates to kidney disease and renal dialysis, myocardial infarct, exercise, and diet. Also cited are the effects of lipid reducing medications and the relationship of hyperlipidemia to atherogenesis. (Contains 48 citations, fully indexed and including a table of contents.)

PB81-858722 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pituitary Gland. January, 1970-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Nov 80.
Jan 81, 90p

This retrospective bibliography contains citations concerning the pituitary gland and its effects on biological function. Discussed are the effect of stress and disease on regulatory function. Also cited are diseases related to hormone regulation and diagnosis and treatment of endocrine gland neoplasms. Diagnoistic techniques for the quantitation of the hormones are discussed. (Contains 70 citations, fully indexed and including a table of contents.)

PB81-858748 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thyroid Hormones. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Jan 81, 81p

This retrospective bibliography contains citations concerning the thyroid hormones. Emphasis is placed upon the methods for quantifying the various hormones. The principle method discussed is RIA. Also discussed are the effects of hypothyroidism and hyperthyroidism on metabolism. Treatment for the various thyroid conditions are discussed, as well as the side effects of radiotherapy. (Contains 67 citations, fully indexed and including a table of contents.)

PB81-859019 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nuclear Medicine. November, 1976-December, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 76-Dec 80.
Jan 81, 240p

The citations in this bibliography cover the study of effects of scattered reaction on physical parameters of a new gamma camera used in nuclear medicine, recent advances in steroid radioimmunoassay, development and application of radioimmunological methods, epidemiological investigations of the treatment of thyroid patients in clinical practice from the point of view of a nuclear medicine ward, scintigraphic instruments and techniques in nuclear medicine, and a report on the national seminar in nuclear medicine. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-859175 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Hodgkins Disease: The Side Effects of Radiotherapy. January, 1978-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 78-Nov 80.
Feb 81, 89p

This retrospective bibliography contains citations concerning the risk of radiation therapy in the treatment of Hodgkin's disease. The results of radiation therapy have increased the five year survival rate; however, radiation has also increased the risk of new cancers arising as a result of this therapy. Many case studies are cited. (Contains 76 citations, fully indexed and including a table of contents.)

PB81-930700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: Antibodies and Humoral Immunity.
Cancergram CB08.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

Antibodies generated against in situ and transplanted tumors are within the scope of this Cancergram. Abstracts included concern studies of both exogenously administered (immunization) and endogenously produced antibodies. Autoimmunity is included when related to anti-tumor activity. Any other immune resistance factors not readily identifiable as tumor antibodies but with similar characteristics are also covered. Circulating antigen-antibody complexes, and other factors which block the immune response to tumors, are of high interest.

PB81-931100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cell Biology: Cell Kinetics.
Cancergram CB09.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

Within the purview of cell kinetics are all studies relating to the characterization and measurement of cell cycle parameters, particularly for in vivo studies of normal and tumor cells, and in vitro studies of derived cell lines. Methodologies for measuring the rates and timing of mitotic activity are highly relevant; however, investigations relating to associated metabolic intracellular events during the process of division are not in scope. Of related interest are the effects of exogenous agents, both chemical and physical, on cell kinetics and any events or activities that are cell cycle-dependent or specific. Growth regulation related to endogenous factors is generally excluded, as it is covered by Cancergram CB16.

PB81-931300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cell Biology: Cytogenetics.
Cancergram CB12.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

All studies concerned with karyotype analysis, banding patterns and other microscope techniques for investigating chromosome number, identification and abnormalities are included. An overview of agents resulting in chromosomal or chromatid damage is essential to the scope of this Cancergram. All gene mapping studies which require cytogenetic analysis to establish the linkage groups for specific genes are included. Clinical studies associating chromosomal abnormalities with risk or presence of cancer are also in scope.

PB81-931800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: Identification and Characterization of Immune Cells.
Cancergram CB17.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram concerns markers used in characterization of cells associated with the immune system in normal and neoplastic states. These include surface antigens, surface immunoglobulins, specific immune receptors (Fc and complement), and rosetting phenomena, as well as other markers which specifically characterize leukocytes. Areas of interest include characterization of leukemic and lymphoma cells; studies of normal leukocyte markers; alteration of these markers after immune activation, neoplastic transformation and treatment with chemical or physical agents; and the detection and characterization of these markers in other normal and neoplastic cells. Tumor-associated and virus-related antigens are not in scope and are covered in Cancergrams CB05 and CB13, respectively.

PB81-932000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: Functional Aspects of Cellular Immunity.
Cancergram CB15.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram focuses on the mechanisms of cell mediated immunity (CMI) and the interaction between CMI and tumors. The scope centers on characterizing functions and methods for monitoring and evaluating CMI in vivo and in vitro, for humans and animal model systems. Related phenomena, such as macrophage-mediated and antibody-dependent cell-mediated cytotoxicity, are covered. Studies related to the functional aspects of the immune response include the role of CMI in tumor rejection, and endogenous factors, suppressor cells, and applied agents that modulate CMI. Structural aspects of the ellular components and identification of immune cell surface markers are generally not in the scope of this Cancergram, nor are papers relating primarily to the humoral (antibody-mediated) immune system. These subjects are covered in Cancergrams CB17 and CB08, respectively.

PB81-935200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Environmental and Occupational Carcinogenesis.
Cancergram CK02.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The epidemiology-oriented Cancergram deals with broad aspects of the origin of source of cancer in the general population. The scope includes factors such as geographic region, ethnic origin, socioeconomic class, lifestyle, emotional health, and personal habits which may be implicated in the development of human cancer. The scope also includes selected articles on environmental pollution, occupation, medical treatment, public policy, and environmental screening tests that have significance for carcinogenesis in the general population. The Cancergram generally excludes articles relating only to narrow population groups, and specifically exludes dietary aspects of human carcinogenesis, which are covered in Cancergram series CK03.

PB81-935700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Gastrointestinal Tract.
Cancergram CK09.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This is an organ-specific Cancergram that deals with carcinogenesis in the esophagus, stomach, small intestines, colon, and anus of both humans and experimental animals. The scope includes the occurrence and etiology of gastrointestinal cancer in the human population, the occurrence and induction of gastrointestinal cancer in experimental animals, carcinogenic mechanisms, and the biological, physiological and morpholigical aspects of the development of gastrointestinal cancer. This Cancergram specifically excludes studies of carcinogenesis of the buccal cavity, liver, gallbladder, bile ducts, and pancreas, which will be covered in other Cancergrams. It also generally excludes studies of diagnosis, treatment, and the pathology of gastrointestinal cancer, except where such studies contribute to the understanding of the carcinogenic process. These clinical aspects are covered by Cancergrams CT07 (Colo-Rectal Cancers) and CT19 (Upper Gastrointestinal Tumors).

PB81-936000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Macromolecular Alteration and Repair.
Cancergram CK11.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the interaction of carcinogens and their metabolic products with macromolecules of the cell. The scope includes macromolecular binding of carcinogens, other macromolecular alterations by carcinogens, repair or reversal of macromolecular alterations, enzyme systems involved in repair or reversal, effects of macromolecular alteration on cell function (exclusive of malignant transformation), and genetic aspects of repair of damaged macromoleculs, including the human disease, xeroderma pigmentosum. By extension, the Cancergram also covers studies of the interaction in vitro of carcinogens with natural or synthetic macromolecules. The scope excludes all studies of carcinogen metabolism, which is covered in Cancergram CK08, and also excludes studies of carcinogen binding to macromolecules where the purpose of the binding data is only to provide evidence of the existence of metabolic activity.

PB81-936700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Respiratory Tract.
Cancergram CK15.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the etiology of cancer of the respiratory tract, including the lungs, bronchi, trachea, larynx, and nasopharynx. Also included are carcinogenesis studies involving the buccal cavity, salivary glands, and lips, when apparently related to inhalation of carcinogens. Areas covered include occurrence and presumptive cause of respiratory tract cancer in human populations, experimental induction and modification of respiratory tract carcinogensis, and morphological, biochemical, and other biological phenomena associated with the induction, development, or modification of respiratory tract cancer. A special category deals with the relationship of tobacco and smoking to respiratory tract cancer. Tobacco-related carcinogenesis involving other organ sites is covered in other Cancergram series, such as CK17 on kidney and urinary tract carcinogensis. Other abstracts dealing with the analysis and more general carcinogenic properties of tobacco smoke are included in Cancergram CK13. Clinical diagnosis and treatment of lung cancer is covered in Cancergram CT08, and of head and neck cancer in Cancergram CT11.

PB81-936800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Short Term Test Systems for Carcinogenicity and Mutagenicity.
Cancergram CK19.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram concerns short-term, rapid tests or assays which screen for the carcinogenicity or mutagenicity of chemicals or other agents. This scope covers the experimental designs and specificities, modifications, and improvements in methodologies, and selections of test vehicles for short-term assays. In addition to reviewing the development of standard procedures, this Cancergram includes the development of reporting standards for mutagen and carcinogen tests. Straightforward test results, reviews, and evaluations of test systems are also covered. This Cancergram specifically excludes studies which use short-term test systems to investigate the molecular mechanisms of carcinogen metabolism or activation, or the molecular interaction of carcinogens/mutagens with macromolecules, as these topics are covered by Cancergram series CK08 (Activation and Metabolism of Carcinogens) and CK11 (Macromolecular Alteration and Repair).

PB81-936900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Reproductive Tract.
Cancergram CK18.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the occurrence, induction, and development of cancer of the male and female reproductive systems, including both principal and accessory sex organs. Subject areas include the occurrence of etiological factors contributing to reproductive tract cancer in humans, experimental induction and modification of reproductive tract cancer, and hormonal, immunological, viral, biochemical, physiological, and other aspects of reproductive tract cancer. Morphological and pathological studies related to cancer screening or cancer control are included, but clinical diagnosis and pathology, treatment, and management of reproductive tract cancer are covered elsewhere, in Cancergrams CT16 (genitourinary) and CT17 (gynecologic). This Cancergram also covers transplacental carcinogenesis, including teratological effects of known or suspected carcinogens or mutagens, but otherwise excluding teratogenesis as a general subject.

PB81-937000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Lymphatic and Hematopoietic Tissues.
Cancergram CK20.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers the occurrence, induction and development of lymphoreticular malignancies, both in humans and in animals. Cancers considered include acute and chronic leukemias, lymphomas, plasmacytomas and such predisposing neoplastic conditions as polycythemia vera. Relevant epidemiological studies are included. Emphasis is placed on experimental studies of lymphatic and hematopoietic carcinogenesis by viruses, irradiation and chemical agents in test animals, and on related studies of transformation in cell cultures. Studies concerning properties of transformed lymphatic or hematopoietic cells are included where they shed light on aspects of lymphoreticular carcinogenesis. These studies include viral, biochemical, immunological, morphological and cytogenetic characterizations of malignant lymphoreticular cells. Oncogenic progression from benign neoplastic conditions to lymphoreticular malignancy is considered. This Cancergram specifically excludes studies of the diagnosis, treatment, and control of lymphatic or hematopoietic cancers, as these topics are covered by Cancergrams CT03, CT05 and CT13.

PB81-937600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Nuclear Medicine.
Cancergram CT02.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the clinical use of radionuclides or nuclear medicine techniques in the care of cancer patients. It also includes any preclinical studies of various radionuclides or techniques considered to have direct clinical diagnostic relevance. Other basic biologic, pharmacologic, or metabolic studies where radionuclides are used as tracers will generally be excluded. Radiotherapy is covered by Cancergram CT15, and Diagnostic Radiology by Cancergram CT14.

PB81-937700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Acute and Chronic Leukemia: Diagnosis, Treatment.
Cancergram CT03.
1981, 12 issues

Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers both acute and chronic leukemia in all of its forms (acute lymphocytic, acute monocytic, acute or sub-acute granulocytic, chronic granulocytic, chronic lymphocytic, chronic monocytic, plasma cell, stem cell, and hairy cell). Other neoplastic conditions of the reticuloendothelial system, lymphatic system, spleen, multiple myeloma, macroglobulinemia, and other monoclonal gammopathies are excluded, since they are covered by Cancergram series CT05 and CT13. This Cancergram includes abstracts concerning all clinical aspects of the disease, such as diagnosis and staging, supportive care, evaluation, and therapy. Animal models, tissue culture experiments, carcinogenesis, and other preclinical studies are generally excluded, except those considered to have direct clinical relevance.

PB81-937900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Lymphomas: Diagnosis, Treatment.
Cancergram CT05.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The scope of this Cancergram includes Hodgkin's disease, adenolymphoma, Burkitt's lymphoma, lymphosarcoma, lymphoblastoma, lymphocytoma, reticulum cell sarcoma, mycosis fungoides, and any not otherwise specified lymphoma. Abstracts are included which concern all clinical aspects of the various forms of lymphoma, such as diagnosis and staging, supportive care, evaluation, and therapy. Animal models, tissue culture experiments, carcinogenesis and other preclinical studies are generally excluded, except for those considered to have direct clinical relevance.

PB81-938100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Colo-Rectal Cancers: Diagnosis, Treatment.
Cancergram CT07.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers clinical aspects of cancers of the anatomical region included from the appendix downward to the anus. Studies of the small bowel, excluded here, appear in Cancergram CT19, Upper Gastrointestinal Tumors. Abstracts included here concern clinically relevant aspects of the prevention, detection, evaluation, diagnosis, and therapy of colonic neoplasms in humans. With certain exceptions, the topic excludes general carcinogenesis, animal system studies, or general preclinical studies not directly relevant to clinical applications. Related carcinogenesis studies are covered by Cancergram CK09.

PB81-938200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Lung Cancer: Diagnosis, Treatment.
Cancergram CT08.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers clinical aspects of cancers of the lung and tracheo-bronchial tree, i.e., the lower respiratory tract. This includes primary lung cancer in both early and advanced disease states. The topic includes clinically relevant aspects of the prevention, detection, diagnosis, evaluation, and therapy of lung cancer. Certain aspects of metastatic lung disease treatment or therapy which involve aspects of interest to primary lung cancer are included. With certain exceptions, general preclinical or animal studies not directly related to the primary human disease are excluded. Respiratory tract carcinogenesis is covered by Cancergram CK15.

PB81-938300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Breast Cancer: Diagnosis, Treatment, Preclinical Biology.
Cancergram CT09.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers clinical aspects of cancers of the mammary glands, the fat pads, and the supporting tissues. Abstracts included concern certain specific types of neoplasms which occur in the breast, and in ancillary tissues related to the breast (axillary lymph nodes, etc.). Also included are selected studies on receptors and the physiological aspects of lactation, pregnancy, and ontogeny related to cancer of the breast. The topic includes clinically relevant aspects of the prevention, detection, diagnosis, evaluation, and therapy of breast cancer. With certain exceptions, preclinical studies of tissue culture systems, or animal model studies which are not directly related to primary human disease are excluded. Related breast carcinogenesis studies are covered by Cancergram CK12.

PB81-938900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Gynecologic Tumors: Diagnosis, Treatment.
Cancergram CT17.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram focuses on neoplastic conditions of the female reproductive system, including tumors of the ovary, fallopian tubes, uterus, cervix, vagina, and vulva. In addition, it covers trophoblastic neoplasia including trophoblastic cancer, hydatidiform mole, and the chorionic neoplasms. This Cancergram does not include tumors of the female urinary system, as these topics are covered by Cancergram CT16. Preclinical studies of animal models, tissue culture experiments, epidemiology, or etiology are generally excluded except for those considered to have direct clinical relevance. Carcinogenesis studies of the female reproductive tract are covered by Cancergram CK18.

PB81-939100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Diagnostic Radiology.
Cancergram CT14.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers the field of diagnostic radiology from amniography to xerography in all of its clinical applications. It also includes such closely related techniques as fluoroscopy, ultrasonography, and thermography. Areas of interest are the clinical applications of these techniques, instrumentation, comparative studies, and any preclinical studies that have direct clinical relevance. Radiation therapy, or the use of radioactive isotopes and other nuclear medicine techniques, are not in scope, as they are covered by Cancergrams CT15 and CT02, respectively.

PB81-939200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
CNS Malignancies: Diagnosis, Treatment.
Cancergram CT18.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers clinical studies concerning all cancers of the brain and spinal cord nerves. Emphasis is upon site-related reports concerning screening, detection, diagnosis, and therapy. Abstracts pertaining to etiology, epidemiology, or other preclinical aspects of nervous system cancer are included only on a very selective basis. The scope of this Cancergram does not include general cancers of the head and neck, as these topics are covered by Cancergram CT11.

PB81-939400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Upper Gastrointestinal Tumors: Diagnosis, Treatment.
Cancergram CT19.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all clinical aspects of tumors of the esophagus, stomach, small intestine, liver, pancreas, gall bladder, and associated ducts. Emphasis is upon detection, diagnosis, and therapy, although selected preclinical studies with special relevance to clinical situations will also be included. Tumors of the lower gastrointestinal tract are the subject of a separate Cancergram CT07. Carcinogenesis studies are covered by Cancergram CK09.

PB81-939500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Endocrine Tumors: Diagnosis, Treatment, Pathophysiology.
Cancergram CT21.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers the clinical aspects of endocrine gland tumors, including detection, diagnosis, pathophysiology, and treatment. The Cancergram also offers selective coverage of the epidemiology and etiology of endocrine tumors, and related preclinical studies. The endocrine tumor surveyed include those associated with intra-site and extra-site tissues of the thyroid, parathyroid, pituitary, pineal, adrenals, pancreas, and gonads (primarily secretory aspects). Additionally, this will include appropriate paraganglia tissues. The thymus is excluded from the present scope of coverage. Clinical studies of gonadal cancers are comprehensively covered by Cancergrams CT16, Genitourinary cancers, and CT17, Gynecologic tumors.

6F. Environmental Biology

AD-A093 708/6 PC **A02**/MF **A01**
Idaho Univ., Moscow.
Nuisance Aquatic Macrophyte Growth in the Northwest,
Ernie Hesser, and E. O. Gangstad. 12 Dec 80, 22p
Contract DACW68-72-C-0269

Aquatic macrophytes of the Columbia and Snake River watersheds were observed at 723 sites in Washington, Oregon, and Idaho and classified according to adjacent land use, water body type, altitude, water temperature, and nuisance growth. The prevalence of eight weed species was subjected to matrix analysis. Nuisance weed growths were most extensive in water bodies where the surrounding land area was near a population center, was heavily grazed by livestock, or received irrigated agricultural runoff. (Author)

BNL-28534 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Responses of Freshwater Plants and Invertebrates to Acidification.
G. R. Hendrey, N. D. Yan, and K. J. Baumgartner. 1980, 33p CONF-8009120-1
Contract AC02-76CH00016
EPA/OECD international symposium for inland waters and lake restoration, Portland, ME, USA, 8 Sep 1980.

Acidic, oligotrophic, clear waters often have strong similarities among their biota. In the phytoplankton, Dinophyceae, and to a lesser extent Chrysophyceae tend to dominate. Production of 25 Canadian

Shield lakes (pH 6.1-7.1) ranged from 25 to 240 mg C m exp -2 d exp -1 . Both biomass and production appear to be controlled by the supply and bioavailability of phosphorus rather than pH per se. We found little evidence of possible C limitation in acidified lakes. There does not appear to be a direct relationship between (H exp +) and biomass density in lakes, as illustrated by whole-lake manipulations of (H exp +) and total phosphorus (TP). These studies, however, do not examine effects of acidification on the whole lake-watershed system. It is suggested that watershed acidification processes such as leaching of Al may reduce TP loading to lakes. Zooplankton community biomass appears to be reduced at low pH and small-bodied forms may dominate. Among the zoobenthos, biomass does appear to be reduced in some lakes but not others. Various studies found shredders; collectors and scrapers to be reduced more than raptorial species. We hypothesize that removal of fish predation on benthos allows a relative increase in the invertebrate predators, reduction of herbivores (chironomids are relatively abundant) and the subsequent increase in benthic algae observed in many waters. (ERA citation 06:006481)

CONF-801231-1 PC **A02**/MF **A01**
Texas Univ. at Dallas, Richardson.
Ecological Reality and Model Validation.
W. G. Cale, Jr., and H. H. Shugart. 1980, 8p
Contract W-7405-ENG-26
International congress on applied systems research and cybernetics, Acapulco, Mexico, 12 Dec 1980.

Definitions of model realism and model validation are developed. Ecological and mathematical arguments are then presented to show that model equations which explicitly treat ecosystem processes can be systematically improved such that greater realism is attained and the condition of validity is approached. Several examples are presented. (ERA citation 06:006463)

DOE/EV-0114 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Environmental Assessments.
Health Effects of Residential Wood Combustion: Survey of Knowledge and Research.
Sep 80, 34p

Health and safety issues related to residential wood burning are examined. Current research and findings are also described, and research status is assessed in terms of future health and safety requirements. (ERA citation 06:002170)

LBL-9818 PC **A14**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effects of Oil Shale-Related Effluents on Some Benthic Freshwater Organisms.
P. P. Russell. Dec 79, 306p
Contract W-7405-ENG-48

Laboratory scale model streams were developed to assess the effects of oil shale-related effluents on lotic freshwater aufwuchs and caddisfly larvae. A major impact of oil shale development in the headwaters of the Colorado River System may be on aquatic organisms in small streams. Colonization and development of aufwuchs were monitored over the course of the 9-day experimental runs. Model stream design allowed variation of water temperature, chemical composition, flow rate and illumination intensity and periodicity. Chemical constancy of the stream water was provided by continuously metering new water to the streams with doses of test effluents. Experimental runs tested Omega-9 water (groundwater diluted, in situ retort water) at dilutions between 0.013% and 2.12%; Unfiltered Omega-9 water at dilutions between 0.27% and 1.06%; 150 ton retort water (retort water from an above-ground, in situ simulator) at dilutions between 0.084% and 0.67%; and ammonium carbonate solutions of 0.56 mM to 4.52 mM. The aufwuchs' response to the effluents was monitored macroscopically, microscopically, and through measurement of biomass, ATP, chlorophyll a, respiration rate and photosynthetic rate. Readily measurable effects in the aufwuchs was produced by exposure to Omega-9 water and Unfiltered Omega-9 water at 1% and higher and 150 ton retort water at 0.34% and higher. High effluent concentrations reduced the percentage of diatoms in the aufwuchs population, increased heterotrophy and promoted sloughing of the aufwuchs mat. Very dilute effluent exposure stimulated aufwuchs productivity. Larvae of the caddisfly Gumaga nigracula were not measurably affected by the Omega-9 water and Unfiltered Omega-9 water concentrations tested, nor by the ammonium carbonate solution. Larvae of the caddisfly Dicosmoecus gilvipes were noticeably affected by concentrations of ammonium carbonate greater than 2mM. (ERA citation 06:006482)

N81-15578/0 PC **A99**/MF **A01**
University of Central Florida, Orlando. Dept. of Biological Sciences.
A Continuation of Base-Line Studies for Environmentally Monitoring Space Transportation System (STS) at John F. Kennedy Space Center. Volume 1: Terrestrial Community Analysis.
Environmental Base Line rept., Jun. 1976 - Mar. 1979.
I. J. Stout. 13 Sep 79, 622p NASA-CR-163122, KSC-TR-51-2-V-L-1
Contract NAS10-8986

Vegetation and small mammal populations in or around the Merritt Island area were studied. Thirty sites were selected from plant communities which were relatively free of logging, grazing, and clearing operations. The vegetative analysis was designed to yield a quantitative description and ecological explanation of the major types of upland vegetation in order to determine the possible future effects of NASA space activities on them. Changes in the relative abundance of small mammal populations, species diversity, standing crop biomass, reproductive activity, and other demographic features were documented in order to gather sufficient information on these populations so that it would be possible to detect even the smaller nonnatural behavior changes in the mammals which might be attributable to NASA space activities.

PB81-148033 PC **A06**/MF **A01**
Boyle Engineering Corp., Orlando, FL.
Tertiary Treatment of Wastewater Using Flow-Through Wetland Systems.
Status rept. no. 2,
Walter R. Fritz, and Steven C. Helle. Mar 80, 115p O-N04-101-50, NSF/RA-800044
Grant NSF-PFR78-19199

Recent research has demonstrated that certain types of wetlands can provide tertiary treatment for effluents from secondary wastewater treatment facilities. To identify and quantify design parameters for implementing such systems, a study is being conducted at a north Florida site near Jasper. This report describes the development of the monitoring system and its preliminary mapping. It presents a brief history of the project, the study approach, the research plan, preliminary results, and recommendations for monitoring future periods. Reports for each of five monitoring programs are included in the appendices: water chemistry; bacterial sampling; vegetation distribution in West Swamp; and an analysis of cypress tree growth rate. The appendices also include research on a water budget study, development of a water budget model, instructions for a water monitoring program, and output from a water budget program. Findings indicate that nitrogen appears to be removed to below AWT levels with a loading rate of about 100 acres per mgd. Phosphorus is not removed as readily. Applying raw and/or primary effluent to a cypress stand appears to be harmful to the trees whereas applying secondary effluent appears to be beneficial.

PB81-150252 PC **A07**/MF **A01**
Clemson Univ., SC. Water Resources Research Inst.
Recolonization of Streams by Aquatic Insects Following Channelization. Volume I.
Technical rept. 1 Jul 75-30 Sep 79,
Tina Renee White, and Richard C. Fox. May 80, 129p WRRI-87, W81-01157, OWRT-A-037-SC(2)
Contracts DI-14-34-0001-9043, DI-14-34-0001-8043
Sponsored in part by Contract DI-14-34-0001-7086.

Recovery, defined as development of an aquatic insect fauna similar to that of the control streams, does not occur in South Carolina streams following channelization. Five channelized streams and two natural streams were sampled over the 1975-1979 period to determine channelization effects on species composition and diversity of aquatic insects in the Piedmont/Costal Plain regions. Study of stream samples revealed that channelization yields a fauna composed principally of very tolerant or normally pond inhabitating species. Taxa preferring fast currents, vegetation, and low turbidity were rarely found in the channelized streams.

PB81-151045 PC **A14**/MF **A01**
Mississippi State Univ., Mississippi State.
Fate and Effect of Oil in the Aquatic Environment - Gulf Coast Region.
Final rept.,
Lewis R. Brown. Jul 80, 306p EPA-600/3-80-058B
Contract EPA-68-01-0745

This report is an appendix to EPA 600/3-80-058a. The project was multi-disciplinary and multi-institutional in scope and involved both laboratory and field sized pilot-plant ecosystem studies. Emphasis was placed on the long-term, low level chronic effects on oil pollution on the ecosystem. Of the five crudes employed in the investigation, Empire Mix crude was studied most intensively.

PB81-151441 PC **E05**/MF **A01**
Huxley Coll. of Environmental Studies, Bellingham, WA.
Whidbey Island Intertidal and Shallow Subtidal Benthos.
Final rept. Mar 77-Jan 79,
H. H. Webber. Nov 80, 105p EPA-600/7-80-167
Includes six sheets of 48x reduction microfiche. Sponsored in part by National Oceanic and Atmospheric Administration, Seattle, WA.

The objectives of this study were to quantitatively characterize the benthos of the intertidal and shallow subtidal areas of three habitats on the west coast of Whidbey Island. The study area was between +6.0' above mean low water to -10.0 m below mean low water. Stratified random sampling was used to select samples. Analysis was to 1 mm in size. This report discusses results for two years of sampling. Included is an analysis of species richness, species diversity, community structure, seasonal changes and dominant forms.

PB81-155848 PC **A05**/MF **A01**
Rhode Island Univ., Narragansett. Coastal Resources Center.
An Interpretive Atlas of Narragansett Bay,
Stephen Olsen, Donald D. Robadue, Jr., and Virginia Lee. Sep 80, 86p URI-MB-40, NOAA-80123004

An attempt is made to synthesize present understanding of how Narragansett Bay functions as an ecosystem and to provide a sense of the changing historical role the Bay has played in the lives of Rhode Islanders.

PB81-160087 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Indoor Air Pollution: An Emerging Health Problem.
Report to the Congress.
24 Sep 80, 46p CED-80-111

Traditionally it has been presumed that a person was protected from polluted air when indoors. Recent research has shown, however, that this may not always be true. Various harmful pollutants including radon, formaldehyde, and nitrogen dioxide have been found in the air in homes, offices, schools, and even in recreational facilities. The problem may even be made worse by Government energy conservation programs which encourage the 'buttoning-up' of buildings. Federal efforts to deal with the problem have been piecemeal, receiving little support primarily because no one Federal agency has responsibility for the problem. Until responsibility is assigned to one agency to oversee Federal efforts, they will continue to be ineffectual. In this report GAO recommends actions that the Environmental Protection Agency and the Congress can take to help resolve the situation.

PB81-802274 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nuclear Power Plants: Ecology and Health Physics. December, 1977-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 77-Dec 80.
Jan 81, 190p
Supersedes PB80-802481, and NTIS/PS-78/1206. See also 1964-November, 1977, NTIS/PS-78/1205.

A compilation of references is presented on subjects related to the environmental impact of nuclear power plants. The following topics are included: Radiation dosage and hazards to animal life and humans; radiation exposure through food chains; radiation monitoring of the ambient environment and protection to personnel and surrounding populations; the effects of thermal pollution; and entrainment of aquatic animals. (This updated bibliography contains 186 citations, 77 of which are new entries to the previous edition.)

PB81-803629 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dredging: Biological Effects. January, 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 79-Jan 81.
Feb 81, 122p
Supersedes PB80-803315, and NTIS/PS-77/1155.

Citation of Federally-funded research cover the relation of dredging to biology in estuaries, marshes, harbors, channels, and waterways. Some of the topics include wildlife habitat of dredge spoil sites, ecosystem studies, and detrimental effects of dredge material. (This updated bibliography contains 115 citations, 15 of which are new entries to the previous edition.)

PB81-858862 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radioecology. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Jan 81, 151p

This retrospective bibliography contains citations concerning the effects of radiation on food chains, acquatic ecosystems and terrestrial ecosystems. Methodology for the assessment of radiation hazards in the environment and measurement of radiation exposure are cited. (Contains 134 citations, fully indexed and including a table of contents.)

UCRL-85238 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Developing Realistic Crop Loss Models for Air Pollutant Stress.
J. R. Kercher. Dec 80, 24p CONF-800886-1
Contract W-7405-ENG-48
E. C. Sakman commemorative symposium, Minneapolis, MN, USA, 20 Aug 1980.

We have developed a model of crop photosynthesis, growth, and yield under pollutant stress. The model simulates the growth and development of crop plants over the course of a growing season. The model uses biochemical and diffusive calculations to determine photosynthesis as a function of light, temperature, CO sub 2 and a sulfur compound (SO sub 2 or H sub 2 S). The model allocates photosynthate to the various plant compartments; calculates light penetration in the canopy; gaseous uptake of the sulfur compound; and the effect of water balances on stomatal resistance. An extensive experimental data base is required to parameterize the model and environmental conditions must be known for model operation. We outline further experimental work that is required to develop more reliable models. Such work should include the effects of pollutants on the long-term behavior of photosynthesis, allocation, energy costs of repair of pollutant damage, and interactions with plant nutrition. (ERA citation 06:006649)

US/IBP-80/1 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Abstracts: US-International Biological Program Ecosystems Analysis Studies. Volume 5. No. 2.
J. A. Watts, and V. G. Myers. Dec 80, 83p
Contract W-7405-ENG-26

This issue documents 162 entries to the US/IBP Abstracts computerized data base. Only contributions from the Eastern Deciduous Forest Biome (EDFB) and the Tundra Biome (TNB) are included. Literature contributions and numeric data are abstracted in this volume. (ERA citation 06:006464)

US/IBP-80/2 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Abstracts: US-International Biological Program Ecosystems Analysis Studies. Volume 5. No. 3-4.
J. A. Watts, and V. G. Myers. Dec 80, 159p
Contract W-7405-ENG-26

This issue documents 1149 entries to the US/IBP Abstracts computerized data base and completes the Abstracts journal series. Contributions from all five US/IBP biomes (Coniferous Forest, Desert, Eastern Deciduous Forest, Grassland, and Tundra) are included. Citations only for theses are included as abstracts were not available to the Ecosystem Analysis Data Center staff. Presentations and literature publications from the Desert Biome (Desert Biome 1975) have also been included in order to document the results of the US/IBP studies as completely as possible. Publication lists submitted by each biome (Brown 1977, Desert Biome 1975, Grassland Biome 1976, Coniferous Forest 1976, Eastern Deciduous Forest 1979) were used in compiling this volume. (ERA citation 06:006465)

6G. Escape, Rescue, and Survival

AD-A093 979/3 PC **A03**/MF **A01**
Army Agency for Aviation Safety, Fort Rucker, AL.
AH-1 Helicopter In-Flight Escape System: A View from the Seat.
Technical rept.,
Paul H. Johnson, and Dwight Lindsey. Nov 79, 30p Rept no. USAAVS-TR-76-1

Studies of AH-1 helicopter accidents indicate many of the fatalities occurring in these unfortunate events could have been prevented had an in-flight escape system been available. A questionnaire was developed and administered to 152 AH-1 pilots to determine their feelings concerning the need for an in-flight escape system in AH-1 aircraft. Analysis of responses shows (a) there are AH-1 in-flight emergencies in which the pilots feel they need and would not be reluctant to use such a system if available, (b) 94% of pilots surveyed responded that 'all attack helicopters should be equipped with an in-flight escape system,' and (c) 60% of the pilots had experienced in-flight situations in which they felt the tension and anxiety would have been reduced had an in-flight escape system been available. (Author)

6H. Food

PB81-146003 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Weight of Units of Foods as Used in Agriculture Handbook No. 456.
Data file,
Cecelia C. Wilkinson, and Betty Perloff. Dec 80, mag tape USDA/DF-81/002
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB81-146656.

This file is a companion file to 456-3 and contains corresponding quantities for the unit of measure used in Handbook 456 for each food item. By taking the product of the nutritive values per 100 grams contained in 456-1 and the corresponding quantities contained in this file (adjusted for refuse), one can create a file comparable to tables 1 and 2 of Handbook 456, or one can use the data in 100 grams and have a data set comparable to Handbook 8.

PB81-146649 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nutritive Value of American Foods in Common Units (Data Set 456).
Data file,
Cecelia Wilkinson, and Betty Perloff. Dec 80, mag tape USDA/DF-81/007
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB81-146656.

This file contains food composition data as published in tables 1 and 2 of Agricultural Handbook No. 456, Nutritive Value of American Foods in Common Units, issued 1975, $5.15. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.) Twenty-one composition values are included: Percent water, food energy, protein, fat, carbohydrates, fiber, ash, calcium, phosphorus, iron, sodium, potassium, vitamin A, thiamin, riboflavin, niacin, ascorbic acid, and cholesterol. These values are given for the food items and the household measures given in the publication. Food item numbers are assigned sequentially with the food descriptions in alphabetical order. The food item numbers are identical to those used in Agricultural Handbook No. 8 for the respective foods. Food descriptions are not included in the file. The user will need a copy of the published handbook to determine the food and the household measure.

PB81-146656 PC **A04**/MF **A01**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Food Composition Data, Food Names and Identification Numbers for Data Sets 456 and 456-3.
1 Dec 80, 58p CFE(ADM)-338, USDA/DF-81/002A
For system on magnetic tape, see PB81-146003, PB81-146649, and PB81-146011.

This document gives the food names and identification number to be used with data set 456-3 and data set 456.

PB81-146730 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Yields and Losses or Gains in Preparation of Foods.
Data file,
Cecelia C. Wilkinson, and Betty Perloff. Sep 75, mag tape USDA/DF-81/003
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density and parity. Call NTIS Computer Products for price.

This file contains data on food yields and losses in food preparation as published in Table 1 of Food Yields--summarized by different stages of preparation, Agriculture Handbook No. 102, revised September 1975. The revised data and additional information in this publication serves as the principal basis for values on refuse in the revisions of Agriculture Handbook No. 8, Composition of Foods---raw, processed, prepared, revised 1963, $3.60. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402). Yields after preparation as well as percent change (by weights) are provided for up to nine variations in preparation for each food item. Each item is identified by an item number which relates directly to the item described in AH 102. No descriptions are contained in this file. This file contains data for 2,894 food items.

PB81-146748 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.

Nutritive Value of Foods Revised 1977.
Data file,
Cecelia C. Wilkinson, and Betty Perloff. Apr 77, mag tape USDA/DF-81/006
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

This file contains food composition data as published in table 2 of Home and Garden Bulletin No. 72, Nutritive Value of Foods revised 1977. Values for food items are described in terms of household measures for the food and are provided for the weight of the household measure, percent water, food energy, protein, fat, saturated fatty acid, oleic acid, linoleic acid, carbohydrate, calcium, phosphorus, iron, potassium, vitamin A value, thiamin, riboflavin, niacin, and ascorbic acid. There are 730 food items included. A three-digit food code has been sequentially assigned to each food item after the items have been placed into food groups. A 24 character description of the food exist on each of the 87 character records.

PB81-146755 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Food Consumption Survey, Hawaii Household, 1977-78.
Data file,
Brucy C. Gray, and Mary Hama. Mar 78, mag tape USDA/DF-81/008
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190189.

This file contains food and nutrient data of 1157 housekeeping Hawaiian households from the USDA Nationwide Food Consumption Survey. The Hawaiian sample was collected during January, February, and March 1978. The sample design provided for an area probability sample of households in the entire Hawaiian Islands. When weights are applied, the total weighted sample gives 1256 interviews. The data were collected by personal interviews with household member most knowledgeable about the household food consumption. A food list was used to help recall kinds, quantities (converted to pounds) and costs of foods used from the household food supply during the 7 days prior to the interview. Counts of meals eaten at home and away from home were recorded for each household member, as well as for guests' meals and/or snacks served from household supply. Money value of all foods per household is summarized. For each food item reported, there are its conversion factor and nutritive value for food energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorous, vitamin A value, thiamin, riboflavin, niacin, vitamin B6, vitamin B12, and ascorbic acid. Other information includes household sizes in equivalent nutrition units, nutritive values per nutrition units, ratios of nutritive value per nutrition unit to the Recommended Dietary Allowances, and weekly aggregate nutritive values. Household income, education and employment of household heads, and other factors that might affect food consumption were reported. Accompanied are the data file format information and code manual with food codes and descriptions of foods.

PB81-146763 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Food Consumption Survey, Alaska Household, 1977-78.
Data file,
Brucy C. Gray, and Mary Hama. Mar 78, mag tape USDA/DF-81/009
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190189.

This file contains food and nutrient data of 2394 housekeeping Alaskan households from the USDA Nationwide Food Consumption Survey. The Alaskan sample was collected during January, February, and March 1978. The sample design provided for an area probability sample of the urban households of Alaska. When weights are applied, the total weighted sample gives 2362 interviews. The data were collected by personal interviews with household members most knowledgeable about the household food consumption. A food list was used to help recall kinds, quantities (converted to pounds) and costs of foods used from the household food supply during the 7 days prior to the interview. Counts of meals eaten at home and away from home were recorded for each household member, as well as for guests' meals and/or snacks served from household supply. Money value of all foods per household is summarized. For each food item reported, there are its conversion factor and nutritive value for food energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorous, vitamin A value, thiamin, riboflavin, niacin, vitamin B6, vitamin B12, and ascorbic acid. Other information includes household sizes in equivalent nutrition units, nutritive values per nutrition unit, ratios of nutritive value per nutrition unit to the Recommended Dietary Allowances, and weekly aggregate nutritive values. Household income, education and employment of household heads, and other factors that might affect food consumption were reported. Accompanied are the data file format information and code manual with food codes and descriptions of foods.

PB81-146771 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Food Consumption Survey, Hawaii Individual, 1977-78.
Data file,
Brucy C. Gray, and Sharon Mickle. Mar 78, mag tape USDA/DF-81/010
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190226.

This file contains food and nutrient intake for 3050 men, women, and children (weighted on household basis, 3,086 individuals, unweighted) collected in Hawaii in Winter 1978, as part of Nationwide Food Consumption Survey 1977-78. The interview was conducted in the home with each individual asked to recall his previous day's diet and then to keep a diet record for the next 2 days which the interviewer returned to review and pick up. Information was gathered on all days of the week including Saturday and Sunday. Data include name for each eating occasion, time, and person(s) sharing it, and if eaten away from home, where eaten, type of service, and cost. For each food and beverage, the kind and quantity (grams) are given and whether from home supplies or obtained away. Data given on vitamin and mineral supplements taken, frequency of consuming organ meats during previous 30 days, whether person is on a diet, whether diet was typical, and self-appraisal of health status. Characteristics available for each individual are sex, age, race, if Spanish descent; estimated height and weight; pregnancy and lactation status for women; household income before taxes (category): household size; and education, occupation, and employment status of male and female heads. Nutrient content of each food, each fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, preformed niacin and vitamins B6, B12, and C.

PB81-147035 PC **A04**/MF **A01**
Purdue Research Foundation, Lafayette, IN. Div. of Sponsored Programs.
Dietary Consumption Distributions of Selected Food Groups for the U.S. Population.
Final rept.,
K. J. Yost, and L. J. Miles. 20 Feb 80, 74p EPA-560/11-80-012
Contract EPA-68-01-4709

Food consumption habits of U.S. population are analyzed and a determination is made of the extent to which fruits and vegetables are home-grown versus commercially produced. Population distributions are given for the consumption of six food groups by both persons who consume meat and do not consume meat. The six food groups are grains and cereals, potatoes, leafy vegetables, legume vegetables, root vegetables, and garden fruits. Both entire U.S. population and 15 to 20-year-old male subpopulation are studied. The six food groups comprise 441 g/person/day of the average U.S. diet, and 564 g/person/day for the 15-20 year old male. Dietary consumption data are reported for percentage of households having home gardens and for consumption which is home-grown. Data are reported for urban, rural nonfarm, rural farm, and all households. Roughly 44 percent of U.S. households have gardens; 50 percent of these have garden areas greater than 750 square feet. Home gardens constitute approximately 6 million acres, approximately equivalent to the acreage used for commercial fruit and vegetable production. Annual value of home-grown produce is estimated at $14 billion.

PB81-152266 PC **A03**/MF **A01**
Instituto de Nutricion de Centro America y Panama, Guatemala City.
Un Mecanismo de Secado para Patatas (Solanum Tuberosum) a Bajas Temperaturas Aplicable en Areas Montanosas de Latinoamerica (Drying Process for Potatoes in Mountainous Areas in Latin America),
Juan de Dios Alvarado, Mario R. Molina, and Ricardo Bressani. Jul 80, 43p
Sponsored in part by Central American Univ., El Salvador. Proceedings of the International Symposium of Engineering (3rd) Held at UCA on July 25-30, 1980. Text in Spanish.

This paper introduces a freeze drying process particularly useful to dry up potatoes in the mountainous areas of Latin America. The principal factor that limits the process is the great extension of time that is required to diminish the humidity level until it reaches appropriate levels to secure the stability of the product.

PB81-154221 PC **A03**/MF **A01**
Florida Univ., Gainesville. Dept. of Food Science and Human Nutrition.
Low Temperature Smoked Fish Fillets: A Potential New Product Form for Florida Fish,
W. Steven Otwell, John A. Koburger, and Robert L. Degner. Dec 80, 36p TP-19, NOAA-80123106
Grant NOAA-04-8-M01-76

The objective of this work was to develop a new product form which could expand the use of traditional and underutilized Florida fish. The product is a skinless and boneless fish fillet which has been flavored by a low temperature smoking (LTS) process. The LTS process requires less heat energy for production and provides a greater product yield than the traditional hot smoking process. The LTS fillets can be frozen and are cooked prior to serving. Market surveys with over 400 respondents have indicated a very positive consumer reaction. The LTS fillets are a unique seafood form which provides consumers with a new seafood choice.

PB81-158347 PC **A06**/MF **A01**
North Carolina State Univ. at Raleigh.
Manual of Seafood Processing and Marketing in North Carolina,
F. B. Thomas, T. M. Miller, N. B. Webb, J. E. Easley, Jr., and Freda A. Ramsey. Jul 80, 116p
UNC-SG-80-04, NOAA-80123002

The report examines present and future aspects of seafood processing and marketing in North Carolina. Seafood freshness is the most important requirement for processing, requiring that rapid cooling and adequate sanitation be initiated promptly at sea. Adequate hold insulation helps achieve rapid cooling, while small refrigeration units for cooling air in holds are suggested as an additional improvement. In North Carolina most processing operations have evolved from existing shore handling facilities. Flow patterns are provided to show what applies to most operations. Logical development of processing and packaging facilities is therefore explained in terms of unit operations, building components, and basic equipment requirements. Technological aspects of marketing include such factors as quality, 'frozen' vs. 'fresh', inspection, consumer preferences, and use of seafoods as economical protein sources.

PB81-159360 PC **A02**
North Carolina State Univ. at Raleigh. Dept. of Food Science.
Incidence of 'Vibrio parahaemolyticus' in and the Microbiological Quality of Seafood in North Carolina,
C. R. Hackney, B. Ray, and M. L. Speck. c1980, 7p UNC-SGR-170, NOAA-80120906
Grants NOAA-04-6-158-44054, NOAA-04-8-M01-66
Pub. in Jnl. of Food Protection, v43 n10 p769-773 Oct 80. Also pub. as North Carolina Agricultural Research Service Paper 6153.

Microbiological analyses of 716 seafood samples over a 3-year period revealed that the microbiological quality of fresh seafood in North Carolina was generally acceptable. The mean aerobic counts (APC) and fecal coliform counts were low as was the occurrence of enteric pathogens, except for Vibrio parahaemolyticus and coagulase-positive staphylococci. Salmonella species were isolated from three samples, but the fecal coliform counts of these samples far exceeded the shellfish standard of the United States Food and Drug Administration. Processing practices were found to influence the occurrence of V. parahaemolyticus in seafood; for example, improperly cleaned flumes were found to be a reservoir for V. parahaemolyticus in mechanical scallop processing plants. Also 'picking' waste 'containers' were found to be sources of V. parahaemolyticus in crab processing plants. Some processing practices such as heat shocking of oysters to facilitate opening were found to reduce the numbers of V. parahaemolyticus. Fifty V. parahaemolyticus isolates from different seafoods were tested for their Kanagawa reaction and all were found to be negative.

6J. Industrial (Occupational) Medicine

AD-A093 809/2 PC **A10**/MF **A01**
National Research Council, Washington, DC.
Principles of Toxicological Interactions Associated with Multiple Chemical Exposures.
Dec 80, 204p
Contract DOT-CG-74248-A

On a typical day, a U.S. Coast Guard inspector may enter confined spaces on as many as five vessels. Because each of these ships may have carried different cargoes, an inspector could be exposed to a mixture of vapors from five different chemicals. An inspector may be exposed almost daily to benzene, various nitriles, methanol, caustic soda, carbon tetrachloride, vinyl chloride, and ammonia with exposure time varying from a few minutes to 2 hours. Although permissible levels (threshold limit values) have been established for these vapors and must be attained before marine personnel can enter a confined space, the Coast Guard has become increasingly concerned about the interactions that might accrue from these exposures and possibly result in deleterious health effects. In 1978, the Coast Guard ask the National Academy of Sciences for guidance on this problem. One portion of this request called for evaluation of possible synergism among certain chemicals during chronic exposures to low concentrations. To perform this task, a Panel on Evaluation of Hazards Associated with Maritime Personnel Exposed to Multiple Cargo Vapors was formed. This report is a first attempt to assess the added hazards, if any, to marine inspectors who are occupationally exposed to multiple chemicals.

CONF-801210-14 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
New Instruments for Plant Area and Personnel Monitoring.
R. B. Gammage, A. R. Hawthorne, T. Vo-Dinh, and D. D. Schuresko. 1980, 20p
Contract W-7405-ENG-26
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 15 Dec 1980.

Advances in portable monitoring instruments and simple luminescence techniques for analyzing polynuclear aromatic hydrocarbons (PNAs) are reported. A small, derivative ultra-violet absorption spectrometer is suitable for multipollutant real-time monitoring of several mono- and bicyclic aromatic vapors. A non-compound selective fluorescence spill spotter and lightpipe luminoscope are active instruments for measuring general surface and skin contamination, respectively. A small passive integrating filter paper exposure device that responds to PNA vapors such a pyrene is a very promising and recent development. Synchronous luminescence and room temperature phosphoresence are two attractive and simple to use analytical methodologies for the rapid assaying of major PNA compounds. Their potential for analyzing the cyclohexane extract of particulate matter, or incorporation into a device for the continuous monitoring of select PNAs in aerosols in near-real-time, are discussed. (ERA citation 06:006658)

HEDL-SA-2269 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
How to Begin Developing an Emergency Plan.
J. V. Stangeland. 1980, 11p
Contract AC14-76FF02170

Guidelines are presented for the development of emergency plans by food and beverage processing facilities to control and minimize the damage which can occur during an emergency. (ERA citation 06:006659)

N81-15674/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Occupational Hypokinesia as a Hygienic Problem.
K. M. Smirnov. Sep 80, 12p NASA-TM-76323
Contract NASW-3199
Transl. into English from Gig. Tr. Prof. Zabol. (USSR), No. 3, Mar. 1980 p 5-9. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By All-Union Central Trade Union Council.

Insufficient motor activity at the work place is discussed as a widely prevalent problem reducing worker efficiency and adversely affecting worker health. Some guidelines are provided for evaluating and promulgating measures to prevent and correct hypokinesia at the work place and compensate for it during off-hours. Suggestions included developing standards for optimal work-related motor activity and setting limits for its reduction.

PB81-143125 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-89-550, the Budd Company, Red Lion Plant, Philadelphia, Pennsylvania,
W. J. Chrostek. Dec 78, 13p NIOSH-HE-78-89-550

Employee exposures to iron oxide (CAS 1309-37-1), welding fumes, fluoride (CAS 7681-49-4), hydrogen chloride (CAS 7647-01-0), and phosgene (CAS 75-44-5) were determined at the Budd Company's (SIC 3714) Red Lion facility in Philadelphia, Pennsylvania on August 31 and September 1, 1978. The evaluation was requested by an authorized employee representative for an unspecified number of employees. Bulk samples of the cutting oil used in steel presses were also analyzed for nitrate (CAS 14797-55-8) and nitrosamines. Some employees completed medical questionnaires. No nitrate or nitrosamine was detected in the cutting oil. No phosgene or fluorides were detected in the air samples. All hydrogen chloride concentrations measured were below the OSHA standard of 7 milligrams per cubic meter (mg/cu m). All iron oxide fume measurements were below the OSHA standard of 10 mg/cu m. Workers reported breathing problems, eye and nose irritation, and dermatitis. The author recommends ventilation improvements.

PB81-143638 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-88-533, Alcan Aluminum Corporation, Fairmont, West Virginia,
W. J. Chrostek. Oct 78, 9p NIOSH-HE-78-88-533

Environmental and medical surveys were conducted on August 15 and 16, 1978, to evaluate employee exposures to oil mist in the rolling department at Alcan Aluminum Corporation (SIC 3353) in Fairmont, West Virginia. The evaluation was requested by an authorized employee representative on behalf of approximately 50 affected employees. Oil mist concentrations ranged from 0.5 to 1.4 milligrams per cubic meter (mg/cu m), which were below the OSHA exposure limit of 5 mg/cu m. Reported symptoms included skin irritation, eye infections, nose bleeds, loss of hair and headaches. The author concludes that a health hazard due to mineral oil mist did not exist at the time of the evaluation. The dermatitis may have been caused by the excessive application of cooling oil to the roller mills. The author recommends that the local exhaust ventilation and makeup air systems be evaluated, changes be made on roller mills to control the coolant and prevent splashing, and employees be encouraged to practice good industrial hygiene habits.

PB81-143885 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-85-513, Tri-District Health Clinic, Algoma, West Viginia,
W. Ollinger, and K. J. Kronoveter. Aug 78, 15p NIOSH-HE-78-85-513

Environmental and medical surveys were conducted on May 24, 1978, to evaluate the toxic exposures to inorganic mercury (CAS 7439-97-6) vapor at the Tri-District Health Clinic in Algoma, West Virginia. The evaluation was requested from the personnel department for an unspecified number of workers. A direct reading instrument showed nondetectable concentrations of contaminants in all tested areas. Long term air sampling revealed mercury concentrations ranging from nondetectable to 0.022 milligrams per cubic meter (mg/cu m) which were below the OSHA standard of 0.10 mg/cu m. Urine sample analysis showed mercury concentrations were below the limit of detection. The authors conclude that a health hazard did not exist at the time of the survey. The authors recommend that floors be stripped of old wax, cleaned and rewaxed periodically to prevent mercury from becoming trapped in floor cracks; that trash be emptied daily; that air be exhausted and not recirculated; that office furniture be made of nonporous materials, and that local exhaust ventilation be installed for the grinder and polisher in the laboratory.

PB81-146938 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Molybdenum and Its Compounds.
Final rept.
Dec 79, 23p
Contract PHS-NIOSH-210-78-0019

This information profile on molybdenum (7439987) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-146953 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Organic Silicon Compounds.
Final rept.

Dec 79, 30p
Contract PHS-NIOSH-210-78-0019

This information profile on organic silicon compounds is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-146961 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Hormones (Excluding Estrogens and Androgens).
Final rept.
Dec 79, 32p
Contract PHS-NIOSH-210-78-0019

This information profile on hormones (excluding estrogens and androgens) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-146979 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Hydraulic Fluid Additives.
Final rept.
Dec 79, 14p
Contract PHS-NIOSH-210-78-0019

This information profile on hydraulic fluid additives is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147456 PC **A04**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. The Food Processing Industry.
Final rept.
Jul 80, 66p
Contract PHS-NIOSH-210-78-0019

This information profile on the food processing industry (SIC-20) is part of a group of 46 such profiles that provide information about chemicals of industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147514 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Dentistry.
Final rept.
Jul 80, 39p
Contract PHS-NIOSH-210-78-0019

This information profile on dentistry (SIC-8021) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147522 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Electric Power Generation Utilities.
Final rept.
Jul 80, 29p
Contract PHS-NIOSH-210-78-0019

This information profile on electric power generation utilities (SIC-4911) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147530 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Electronics Manufacture.
Final rept.
Jul 80, 37p
Contract PHS-NIOSH-210-78-0019

This information profile on electronics manufacture (SIC-367) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147548 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. The Fertilizer Industry.
Final rept.
Jul 80, 44p
Contract PHS-NIOSH-210-78-0019

This information profile on the fertilizer industry (SIC-287) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147555 PC **A04**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Ferrous Smelting and Steel Manufacture.
Final rept.
Jul 80, 52p
Contract PHS-NIOSH-210-78-0019

This information profile on ferrous smelting and steel manufacture (SIC-331) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147589 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. The Wood-Based Panel Products Industry.
Final rept.
Jul 80, 35p
Contract PHS-NIOSH-210-78-0019

This information profile on the wood-based panel products industry (SIC-2435, 2436, 2492, 2499) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147639 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Ethyl Silicate.
Final rept.
Dec 79, 14p
Contract PHS-NIOSH-210-78-0019

This information profile on ethyl silicate (78104) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147647 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Dimethyl Terephthalate.
Final rept.
Dec 79, 20p
Contract PHS-NIOSH-210-78-0019

This information profile on dimethyl terephthalate (120616) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147654 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Dimethyl Sulfate.
Final rept.
Dec 79, 16p
Contract PHS-NIOSH-210-78-0019

This information profile on dimethyl sulfate (77781) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147662 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. N,N-Dimethyl Formamide.
Final rept.
Dec 79, 15p
Contract PHS-NIOSH-210-78-0019

This information profile on N,N-dimethyl formamide (68122) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147670 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Oil Well Drilling and Services.
Final rept.
Jul 80, 28p
Contract PHS-NIOSH-210-78-0019

This information profile on oil well drilling and services (SIC-1311, 1381, 1382, 4612) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147688 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. The Wrecking and Demolition Industry.
Final rept.
Jul 80, 18p
Contract PHS-NIOSH-210-78-0019

This information profile on the wrecking and demolitions industry (SIC-1795) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147696 PC **A04**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Nonferrous Smelting.
Final rept.
Jul 80, 54p
Contract PHS-NIOSH-210-78-0019

This information profile on nonferrous smelting (SIC-333) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class or chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147845 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Jewelry Manufacturing.
Final rept.
Jul 80, 35p
Contract PHS-NIOSH-210-78-0019

This information profile on jewelry manufacturing (SIC-391) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147852 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Infrasonics.
Final rept.
Jul 80, 16p
Contract PHS-NIOSH-210-78-0019

This information profile on infrasonics is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147878 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Aryl Phosphates.
Final rept.
Dec 79, 18p
Contract PHS-NIOSH-210-78-0019

This information profile on aryl phosphates is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147886 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Amorphous Silicas.
Final rept.
Dec 79, 16p
Contract PHS-NIOSH-210-78-0019

This information profile on amorphous silicas (763189, 60676860, 1343982) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147894 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Acrylic Acid and its Esters.
Final rept.
Dec 79, 27p
Contract PHS-NIOSH-210-78-0019

This information profile on acrylic acid (79107) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147902 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Aryl Sulfonic Acid and Salts.
Final rept.
Dec 79, 17p
Contract PHS-NIOSH-210-78-0019

This information profile on aryl sulfonic acids and salts is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147910 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Cyclopentadienes.
Final rept.
Dec 79, 19p
Contract PHS-NIOSH-210-78-0019

This information profile on cyclopentadienes is part of a group of 46 such profiles that provide in-

formation about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147936 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Terephthalic Acid.
Final rept.
Dec 79, 11p
Contract PHS-NIOSH-210-78-0019

This information profile on terephthalic acid (100210) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147944 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Phosphoramide.
Final rept.
Dec 79, 14p
Contract PHS-NIOSH-210-78-0019

This information profile on phosphoramide (680319) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147951 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Acrolein.
Final rept.
Dec 79, 23p
Contract PHS-NIOSH-210-78-0019

This information profile on acrolein (107028) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147969 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Tert-Butylamine.
Final rept.
Dec 79, 12p
Contract PHS-NIOSH-210-78-0019

This information profile on tert-butylamine (75649) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147977 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Cyanogen.
Final rept.
Dec 79, 11p
Contract PHS-NIOSH-210-78-0019

This information profile on cyanogen (460195) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-147985 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Carbon Oxysulfide.
Final rept.
Dec 79, 10p
Contract PHS-NIOSH-210-78-0019

This information profile on carbon oxysulfide (463581) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-147993 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. n-Butyl Acetate.
Final rept.
Dec 79, 15p
Contract PHS-NIOSH-210-78-0019

This information profile on n-butyl acetate (123864) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-148009 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. N,N-Dimethyl Acetamide.
Final rept.
Dec 79, 14p
Contract PHS-NIOSH-210-78-0019

This information profile on N,N-dimethyl acetamide (127195) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-148017 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. Cyclohexylamine.
Final rept.
Dec 79, 17p
Contract PHS-NIOSH-210-78-0019

This information profile on cyclohexylamine (108918) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information in their workplaces.

PB81-148819 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Fluorescent Whitening Agent (FWA's).
Final rept.
Dec 79, 29p
Contract PHS-NIOSH-210-78-0019

This information profile on fluorescent whitening agents (FWA's) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-148827 PC **A04**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume III. Industrial Processes. Hairdressing and Barbering.
Final rept.
Jul 80, 65p
Contract PHS-NIOSH-210-78-0019

This information profile on hairdressing and barbering (SIC-7231, 7241) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-148835 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.

Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Tetramethylbenzenes.
Final rept.
Dec 79, 12p
Contract PHS-NIOSH-210-78-0019

This information profile on organic peroxides is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-148843 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Polyethylene Glycols.
Final rept.
Dec 79, 21p
Contract PHS-NIOSH-210-78-0019

This information profile on polyethylene glycols is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-148892 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II: Chemical Classes. Methacrylic Acid and Its Esters.
Final rept.
Dec 79, 20p
Contract PHS-NIOSH-210-78-0019

This information profile on methacrylic acid (79414) is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-149668 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-103-561, Weld County Hospital, Greeley, Colorado,
B. J. Gunter. Feb 79, 14p NIOSH-HE-78-103-561

Exposure to halothane, ethrane (CAS 13838-16-9), and nitrous oxide (CAS 10024-97-2) in the operating rooms of Weld County Hospital (SIC-806) in Greeley, Colorado was determined on June 29, 1978. The evalution was requested by the hospital management on behalf of the 30 workers in the operating rooms. Measured halothane concentrations ranged from below the limit of detection to 1.73 parts per million (ppm); 2 of 28 samples exceeded the NIOSH recommended concentration of 0.5 ppm. Ethrane concentrations ranged from undetectable to 16 ppm; 3 of 28 samples exceeded the NIOSH recommended concentration of 0.5 ppm. Nitrous oxide concentrations ranged from 5 to 65 ppm; 8 of 34 samples exceeded the NIOSH recommended concentration of 25 ppm. The author concludes that the concentrations of anesthetic gases in the operating rooms did not pose an immediate danger to employees. The author recommends that anesthetic equipment be checked and maintained regularly, the scavenging system of the anesthetic cart be improved, and equipment be properly maintained.

PB81-149718 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-49-553, National Steel Drum Company, Philadelphia, Pennsylvania,
G. E. Burroughs. Jan 79, 14p NIOSH-HE-78-49-553

Personal and area environmental samples were analyzed for iron oxide (CAS 1309-37-1), total particulate, hydrochloric acid (CAS 7647-01-0), sodium hydroxide (CAS 1310-73-2), benzene (CAS 71-43-2), toluene (CAS 108-88-3), and xylene (CAS 1330-20-7) at the National Steel Drum Company (SIC-7699) in Philadelphia, Pennsylvania on March 20 to 22, 1978. The evaluation was requested by an authorized employee representative on behalf of approximately 30 employees. Workplace concentrations of all chemicals except sodium hydroxide were below maximum permissible standards. Three sodium hydroxide measurements were equal to or greater than the OSHA standard of 2 milligrams per cubic meter. However, the sampling methods for sodium hydroxide were questionable and no irritation was experienced by investigator or employees. Several other chemicals were detected but were not identified. Among 14 former employees whose vital status could be determined, five of seven deaths were due to cancer; four of the five cancer deaths involved tumors of the lung or bronchea. The investigator concludes that there is insufficient evidence to confirm the existence of a health hazard at the facility. He recommends that employee exposures to chemicals in incoming drums, be reduced and that ventilation, maintenance, and use of safety equipment be improved.

PB81-150468 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-116-557, Commonwealth Trading Company, Stoughton, Massachusetts,
C. L. Moseley, M. Singal, and L. Murphy. Jan 79, 25p NIOSH-HE-78-116-557

Environmental and medical surveys were conducted on August 16 and 17, 1978, to evaluate the potential for employee exposure to formaldehyde (50000) of other toxic substances in the workplace at the Commonwealth Trading Company (SIC-5137) in Stoughton, Massachusetts. The evaluation was requested by the employer on behalf of the approximately 225 affected employees. Airborne formaldehyde concentrations ranged from 0.04 to 0.73 parts per million(ppm), well below the 3ppm OSHA standard, but exceeding the 0.5ppm action concentration. Medical interviews indicated that the irritative symptoms were compatible with the known effects of formaldehyde exposure. The authors conclude that employees were not exposed to a health hazard from chemicals during the survey. They also conclude that the pattern of results obtained from a detailed human factors questionnaire is indicative of stress induced mass psychogenic illness, triggered by low concentrations of formaldehyde vapor escaping from permanent press clothing. The authors recommend that engineering controls be implemented and work practices be changed to reduce the chance of employee exposure, that the temperature difference between the office area and the warehouse area be reduced on hot days, that the shipping doors be kept open whenever possible on hot days, that employees who experience problems be allowed to perform other jobs, that periodic wet mopping or vacuuming be done to reduce dustiness, and that sensitized employees not be allowed to become exposed to formaldehyde.

PB81-150492 PC **A04**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 77-41-505, General American Transportation Corporation, Masury, Ohio,
J. H. Price. Jul 78, 56p NIOSH-HE-77-41-505

Environmental and medical surveys were conducted on April 4 to 7, 1977, and June 7 to 9, 1977, to determine employee exposures to dust fumes, smoke and gases from welding and plasma arc cutting, *isocyanate (661201) vapors and x-ray radiation at the General American Transportation Corporation (SIC-3743) in Masury, Ohio. Authorized representatives of United Steelworkers of America, Local 1534 and 2318, requested the evaluation on behalf of approximately 1000 affected workers. Twenty four of 52 employees were exposed to concentrations of fluoride (16984488), copper (7440508), iron oxide (1309371), nickel (7440020), chromium VI (7440473), vanadium (7440622) and total particulates in excess of OSHA standards. Concentrations of carbon monoxide (630080), formaldehyde (50000) and polymethylene polyphenyl isocyanate also exceeded current OSHA exposure limits. No abnormalities other than abrasions and burns associated with welding and heavy metal handling were found. The author concludes that excessive contaminant emissions are produced from welding, air arc repairing, chipping and gouging, bank cleaning and grinding. Local ventilation should be instituted to control excessive emissions, respiratory protection should be used, fibrous glass insulation treated with resin materials and used to seal annealing furnace doors should be substituted with a safer material, undue exposure to isocyanates should be avoided when handling urethane foams, and continuous surveillance should be maintained on all radiography equipment.

PB81-150625 PC **A03**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Polyurethanes.
Final rept.
Dec 79, 31p
Contract PHS-NIOSH-210-78-0019

This information profile on polyurethanes is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-154395 PC **A09**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Assessment of Locomotive Crew In-Cab Occupational Noise Exposure.
Final rept.,
Roger D. Kilmer. Dec 80, 185p FRA/ORD-80/91

The railroad industry, unlike most other U.S. industries, is not subject to the safety regulations of the Occupational Safety and Health Administration. Instead, railroad workers are covered by the safety regulations of the Federal Railroad Administration (FRA). This report documents an extensive study designed to assess the noise environment in locomotive cabs. Operational duty cycle and in-cab sound level data are presented for 18 test runs made on 16 different locomotives used in wide range of operational modes (e.g., through freight and local transfer freights), varies terrains (mountainous, undulating and flat) and varied trip lengths (6 to 12 hours). The general conclusion of this study is that there does not appear to be a widespread problem of overexposure to noise based on the same type of evaluation as currently used by OSHA (only 1 out of 18 test runs exceeded the criteria). The noise exposure is within acceptable

limits because the operational duty cycle is such that the sources which generate high sound levels (horn and brake) are operating only for short periods of time and because the locomotive spends a great deal of time in idle (diesel engine sound levels below 90 dB). However, there was one test run for which an overexposure to noise was measured. To pinpoint such cases where overexposure to noise may occur, a simplified testing procedure is developed. This test consists of making in-cab sound level measurements of engine notch 8 (no load), horn sounding and brake application with the locomotive stationary. With these three sound level measurements and an estimate of the time that the locomotive is operating on-line, the in-service noise dose can be estimated and a pass/fail assessment made of whether the noise exposure might exceed acceptable limits.

UCID-18006(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Lawrence Livermore Laboratory's Beryllium Control Program for High-Explosive Test Firing Bunkers and Tables.
J. S. Johnson. 25 Nov 80, 15p
Contract W-7405-ENG-48

This report on the control program to minimize beryllium levels in Laboratory workplaces includes an outline of beryllium surface, soil, and air levels and an 11-y summary of sampling results from two high-use, high-explosive test firing bunkers. These sampling data and other studies demonstrate that the beryllium control program is functioning effectively. (ERA citation 06:005488)

6K. Life Support

N81-15700/0 PC **A03**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Development of a Trash Handling Subsystem for a Manned Spacecraft.
Final rept.,
M. Burnett. Nov 80, 36p DRL-T-1496, CR-160904
Contract NAS9-15778

A prototype laboratory system to shred and transport trash material within a spacecraft was designed and demonstrated. In addition to handling the normal trash materials, the system demonstrated the ability to handle or reject (if it is too tough) glass, metal and ceramics without damaging the system. The system is not dependent on liquids for the shredding and transportation and can transport slurried, damp or dry material. The resulting system offers a greater system flexibility with operational reliability.

N81-15701/8 PC **A04**/MF **A01**
Life Systems, Inc., Cleveland, OH.
Triple Redundant Hydrogen Sensor with In Situ Calibration.
Final rept., Jul. 1976 - Nov. 1980.
J. B. Lantz, J. D. Powell, F. H. Schubert, and E. P. Koszenski. Nov 80, 56p NASA-CR-160862, LSI-TR-407-4
Contracts NAS9-16065, NAS9-14658

To meet sensing and calibration needs, an in situ calibration technique was developed. It is based on electrolytic generation of a hydrogen/air atmosphere within a hydrogen sensor. The hydrogen is generated from water vapor in the air, and being electrical in nature, the in situ calibration can be performed completely automatically in remote locations. Triply redundant sensor elements are integrated within a single, compact housing, and digital logic provides inter-sensor comparisons to warn of and identify malfunctioning sensor elements. An evaluation of this concept is presented.

6L. Medical and Hospital Equipment

PB81-152803 PC **A08**/MF **A01**
PRC Information Sciences Co., McLean, VA.
Medical Device Reference File. Plastics: Contact and Intraocular Lenses.
Final rept.
Sep 80, 162p FDA/BMD-81/33
Contract FDA-223-79-5065
See also PB81-152811.
Also available in set of 6 reports PC E20, PB81-152795.

The Medical Device Reference File (MDRF) provides information on the production and quality control of medical devices which are of particular interest to FDA. There are several volumes of the MDRF, with each one having information on a specific product, i.e., this volume discusses production of contact and intraocular lenses. All volumes are organized in the same way: an introductory chapter; two chapters which describe thd product's use, classification, and an overview of production; a final chapter on complaints; and six core chapters that describe in more detail product production including: Receive and test material/components; Manufacture/assemble product; Final test product; Package and label product; Sterilize product; Warehouse and distribute product. The format of each core chapter is also standardized throughout each volume of the MDRF, to include a summary, flowchart, process chart, and GMP consideration.

PB81-152811 PC **A08**/MF **A01**
PRC Information Sciences Co., McLean, VA.
Medical Device Reference File. Plastics: Syringes.
Final rept.
Sep 80, 165p FDA/BMD-81/34
Contract FDA-223-79-5065
See also PB81-152803, and PB81-152829.
Also available in set of 6 reports PC E20, PB81-152795.

The Medical Device Reference File (MDRF) provides information on the production and quality control of medical devices which are of particular interest to FDA. There are several volumes of the MDRF, with each one having information on a specific product, i.e., this volume discusses production of syringes. All volumes are organized in the same way: an introductory chapter; two chapters which describe the product's use, classification, and an overview of production; a final chapter on complaints; and six core chapters that describe in more detail product production including: Receive and test material/components; Manufacture/assemble product; Final test product; Package and label product; Sterilize product; Warehouse and distribute product. The format of each core chapter is also standarized throughout each volume of the MDRF, to include a summary, flowchart, process chart, and GMP considerations.

PB81-152829 PC **A08**/MF **A01**
PRC Information Sciences Co., McLean, VA.
Medical Device Reference File. Plastics: Airways/Tubes.
Final rept.
Sep 80, 155p FDA/BMD-81/35
Contract FDA-223-79-5065
See also PB81-152811, and PB81-152837.
Also available in set of 6 reports PC E20, PB81-152795.

The Medical Device Reference File (MDRF) provides information on the production and quality control of medical devices which are of particular interest to FDA. There are several viumes of the MDRF, with each one having information on a specific product, i.e., this volume discusses production of airways/tubes. All volumes are organized in the same way: an introductory chapter; two chapters which describe the product's use, classification, and an overview of production; a final chapter on complaints; and six core chapters that describe in more detail product production including: Receive and test material/components; Manufacture/assemble product; Final test product; Package and label product; Sterilize product; Warehouse and distribute product. The format of each core chapter is also standardized throughout each volume of the MDRF, to include a summary, flowchart, process chart, and GMP considerations.

PB81-152837 PC **A08**/MF **A01**
PRC Information Sciences Co., McLean, VA.
Medical Device Reference File. Plastics: Blood and Solution Filters.
Final rept.
Sep 80, 170p FDA/BMD-81/36
Contract FDA-223-79-5065
See also PB81-152829, and PB81-152845.
Also available in set of 6 reports PC E20, PB81-152795.

The Medical Device Reference File (MDRF) provides information on the production and quality control of medical devices which are of particular interest to FDA. There are several volumes of the MDRF, with each one having information on a specific product, i.e., this volume discusses production of blood and solution filters. All volumes are organized in the same way: an introductory chapter; two chapters which describe the product's use, classification, and an overview of production; a final chapter on complaints; and six core chapters that describe in more detail product production including: Receive and test material/components; Manufacture/assemble product; Final test product; Package and label product; Sterilize product; Warehouse and distribute product. The format of each core chapter is also standardized throughout each volume of the MDRF to include a summary, flowchart, process chart, and GMP considerations.

PB81-152845 PC **A08**/MF **A01**
PRC Information Sciences Co., McLean, VA.
Medical Device Reference File. Plastics: Intrauterine Contraceptive Devices.
Final rept.
Sep 80, 159p FDA/BMD-81/37
Contract FDA-223-79-5065
See also PB81-152837, and PB81-152852.
Also available in set of 6 reports PC E20, PB81-152795.

The Medical Device Reference File (MDRF) provides information on the production and quality control of medical devices which are of particular interest to FDA. There are several volumes of the MDRF, with each one having information on a specific product, i.e., this volume discusses production of intrauterine contraceptive devices. All volumes are organized in the same way: an introductory chapter; two chapters which describe the product's use, classification, and an overview of production; a final chapter on complaints; and six core chapters that describe in more detail product production including: Receive and test material/components; Manufacture/assemble product; Final test product; Package and label product; Sterilize product; Warehouse and distribute product. The format of each core chapter is also standardized throughout each volume of the MDRF, to include a summary, flowchart, process chart, and GMP considerations.

PB81-152852 PC **A08**/MF **A01**
PRC Information Sciences Co., McLean, VA.
Medical Device Reference File. Plastics: Catheters.
Final rept.
Sep 80, 172p FDA/BMD-81/38
Contract FDA-223-79-5065
See also PB81-152845.
Also available in set of 6 reports PC E20, PB81-152795.

The Medical Device Reference File (MDRF) provides information on the production and quality control of medical devices which are of particular interest to FDA. There are several volumes of the MDRF, with each one having information on a specific product, i.e., this volume discusses production of catheters. All volumes are organized in the same way: an introductory chapter; two chapters which describe the product's use, classification, and an overview of production; a final chapter on complaints; and six core chapters that describe in more detail product production including: Receive and test material/components; Manufacture/assemble product; Final test product; Package and label product; Sterilize product; Warehouse and distribute product. The format of each core chapter is also standardized throughout each volume of the MDRF, to include a summary, flowchart, process chart, and GMP considerations.

PB81-803082 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Electrocardiography. 1973-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Dec 80.

Feb 81, 63p
Supersedes PB80-804040. Sponsored by National Technical Information Service, Springfield, VA.

These citations from the international literature provide descriptions of electrocardiographic case studies, instrumentation, modeling, measurements, telemetry computerization, and data analysis. A wide range of application electrocardiographic techniques is summarized in these abstracts, and correlations of the techniques of scalar-, vector-, echo-, angio-, and polarcardiography are discussed. (This updated bibliography contains 272 citations, 18 of which are new additions to the previous edition.)

6M. Microbiology:

PB81-150708 PC **A04**/MF **A01**
National Board of Waters, Helsinki (Finland). Water Research Inst.
Tracing Water Movement by Means of Escherichia Coli Bacteriophages,
Kari Kinnunen. 1978, 53p ISBN-951-46-3344-X, 25
Also pub. as ISSN-0355-0982.

The author has developed a method which uses Escherichia coli bacteriophages as tracers of water movements. The method has been tested in rivers, ground waters, municipal waste water treatment plants and a lake polluted by pulp and paper mill effluents. The phage tracer was found to suit rivers, and on certain conditions, the other water bodies referred to above. The method has several advantages: (1) It is harmless to the environment. (2) Great dilution ratio 10 to the minus 11th power - 10 to the minus 13th power equals that of radioactive tracers and neutron activation analysis tracers, and considerably exceeds that of fluorescent dyes. (3) Several water fractions can be marked simultaneously. (4) The cost is relatively low. The most serious disadvantage is the delay in obtaining the results; water samples have to be analyzed in the laboratory and the result cannot be enumerated until 4 to 6 hours after plating the samples.

PB81-155459 PC **A02**
New York Sea Grant Inst., Albany.
Pathogenesis of Experimental Vibriosis in Larval American Oysters, 'Crassostrea virginica',
Ralph Elston, and Louis Leibovitz. 1980, 19p NYSG-RR-80-32, NOAA-80122310
Pub. in Canadian Jnl. of Fisheries and Aquatic Sciences, v37 n6 p964-978 1980.

Larval oysters were experimentally infected with isolates of pure cultures of marine Vibrio sp. These animals were studied live, histologically, with the immunofluorescent test and with electron microscopy. All inoculated groups, but no control groups, demonstrated decreased growth and/or high mortality. One bacterial isolate attached preferentially to larval shell and destroyed mantle tissue as it grew along the internal surface of the shell. Phagocytes consumed invading bacterial cells but were ultimately overwhelmed by the infection. The second bacterial isolate caused velar damage in young larvae that remained active. In these larvae, the velar cells became detached or internally disorganized and lost their rectractor muscle insertions. In more advanced larvae, detachment of absorptive cells of the digestive gland was the earliest change observed and seemed to result from attachment of bacterial antigens to the cell surface. In both younger and more advanced larvae, food cycling and nutrient utilization were disrupted early in the disease process. The older larvae showed a general atrophy.

PB81-931000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Viral Immunology.
Cancergram CB13.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers antigens identified with all viruses associated with cancer: both DNA and RNA viruses, in humans, other primates, and in subprimate species. The antigens may be expressed within infected cells, on cell surfaces, on free virus particles, or in cell-free fluids or extracts. Emphasis is placed on characterization of the antigens of particular viruses and viral components. Selected abstracts concerning the immune response of the host cell to viruses and viral antigens are also included.

PB81-931500 Suscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
DNA Tumor Viruses in Non-Primate Systems.
Cancergram CB11.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

All studies on DNA viruses of established or potential significance in cancer etiology are in scope, excluding all studies of DNA viruses in humans and other primates. However, all studies of human and other primate DNA viruses conducted in animal cells other than humans or other primates are included. Studies concerning the excluded viruses related to primate systems appear in Cancergram series CB04.

PB81-931700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
RNA Viruses Associated with Cancer: Molecular Biology.
Cancergram CB23.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram concentrates on molecular aspects of all RNA viruses of established or potential significance in cancer etiology, including those infecting human tissues. Topics featured include viral RNA and protein chemistry, reverse transcription, viral DNA intermediates, and proviral DNA. Cellular and animal level studies of these RNA viruses are covered by Cancergram CB22, entitled RNA Viruses Associated With Cancer--Cell Biology and Animal Studies.

6O. Pharmacology

AC-A093 829/0 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
The Effects of Three Halogenated Alkanes on Excitation and Contraction in the Isolated, Perfused Rabbit Heart,
P. A. Toy, E. W. Van Stee, A. M. Harris, M. L. Horton, and K. C. Back. 9 Dec 75, 12p Rept no. AFAMRL-TR-75-103
Pub. in Toxicology and Applied Pharmacology, v38 p7-17 1976.

No abstract available.

PB81-148645 PC **A03**/MF **A01**
Food and Drug Administration, Rockville, MD. Office of Planning and Evaluation.
Approvals and Non-Approvals of New Drug Applications during the 1970's.
Final rept. 1970-79,
Jonathan Cook, Priscila Prunella, Stanley Stringer, and Mark Vacura. Dec 80, 50p FDA/ACPE-81/43, OPE-STUDY-57

The report presents findings on approvals and non-approvals of New Drug Applications (NDAs) as follows: (1) NDAs submitted during 1970--1979: (a) approval rates by chemical type (new chemical entity, already-marketed drug, etc.), therapeutic importance class (therapeutically significant, etc.), and applicant. Among other findings the report shows that approval rates increase with the number of NDAs submitted per applicant; (b) approval times by chemical type and by therapeutic importance class; (2) Deficiencies in NDAs submitted in 1977-1978. The report identifies 2090 deficiencies in 105 NDAs. Most of these deficiencies (61 percent) were in the chemistry-manufacturing area; 22 percent were in the area of proof of safety and effectiveness of the new drug substance; twelve percent related to labelling; and five percent to submissions of samples of the new drug substance.

PB81-149213
(Order as PB81-149148, PC **A05**/MF **A01**)
Chongqing Medical Coll. (China). Dept. of Infectious Diseases.
Comparison of Praziquantel, Amoscanate and Hexachloroparaxylol in Clonorchiasis Sinensis,
Wang Qinan, Liu Jibai, Liu Yuehan, Chen Rongxin, and Qiu Zhongda. Dec 80, 8p
Included in Chinese Medical Jnl., v93 n12 p849-856 1980.

Efficacy of praziquantel, amoscanate, hexachloroparaxylol (HCX) and a combination of the latter 2 in 98 cases of clonorchiasis are compared in a controlled study. Each drug has certain therapeutic effects, but HCX polyethylene glycol (PEG) droplet pill is the best agent. Using the formaldehyde-ether concentration method for examining fecal eggs, the negative turn-over rate at the end of 1 month of HCX is 89.3% and the cure rate is 82.8% at the end of the third month. HCX then is the drug of choice in clonorchiasis. Praziquantel at 20 mg/kg/day for 5 days had a 33.3% third month cure rate with an egg reduction rate of 85.2%. Amoscanate at 2 mg/kg/day for 5 days, had an 80.8% negative egg turn-over rate at the end of 1 month, but this dropped to 38.5% at the end of the third month. It is suggested that this drug can only inhibit fluke egg laying temporarily.

PB81-932200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Antitumor and Antiviral Agents: Mechanisms of Action.
Cancergram CB19.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram concerns preclinical studies of any drugs and agents that have, or are being tested for, antitumor, antimetastatic, and/or antiviral properties, either in vivo or in vitro. The scope centers on the mechanism of action of the drugs (structure-activity relationships, effects exerted at the cellular or subcellular level), their metabolism (including transport, binding, and conversion), and physical and chemical analysis, characterization, and synthesis of the agents. Studies involving human patients are excluded. Studies concerning toxicity, pharmacokinetics, and efficacy of antitumor and antiviral agents are generally excluded unless they stress, or are coupled with, aspects listed above as in scope. These excluded areas are covered by Cancergram CB20, entitled Antitumor and Antiviral Agents--Experimental Therapeutics, Toxicology, Pharmacology.

6P. Physiology

AD-A093 915/7 Not available NTIS
New Jersey Medical School, Newark. Dept. of Pharmacology.
Modulatory Effect on Brain Acetylcholine on Reflex-Induced Bradycardia and Tachycardia in Conscious Rats,
A. P. Caputi, F. Rossi, K. Carney, and Henry E. Brezenoff. 25 Mar 80, 9p ARO-15947.5-L
Grant DAAG29-79-G-0024
Availability: Pub. in The Jnl. of Pharmacology and Experimental Therapeutics, v215 n2 p309-316 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 962/9 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.

The REM Cycle is a Sleep-Dependent Rhythm,
L. C. Johnson. Apr 80, 11p Rept no. NAVHLTHRSCHC-80-2
Pub. in Sleep, v2 n3 p299-307 1980.

No abstract available.

CEA-CONF-4758 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Use of Stable Isotopes in the Study of Human Cholesterol Metabolism.
H. Virelizier, R. Hagemann, J. Ferezou, and F. Chevallier. 1979, 11p CONF-790893-2
International mass spectrometry conference, Oslo, Norway, 11 Aug 1979.
U.S. Sales Only.

An experimental procedure based on the use of stable isotope spiked molecules of cholesterol, allows the measurement in faecal cholesterol of the relative parts coming from the plasma by transfer (deuterium spiked molecules), from the non absorbed alimentary cholesterol (exp 13 C spiked molecules) and from the external intestinal secretion (not labelled way). The patient receives a dose of D sub 8 (2, 2', 3, 4, 4', 6, 7, 7') cholesterol intravenously and an oral dose of 3,4 exp 13 C cholesterol. The plasmatic cholesterol transfer is calculated from the ratio of the measured dilutions of the faecal and plasmatic D sub 8 cholesterol. The non absorbed cholesterol is estimated from the percentage of exp 13 C cholesterol measured in the faecal sterols within the six days following the oral dose ingestion. The D sub 8 cholesterol dilutions are measured using the GC-MS technique on the trimethylsilyl derivatives of cholesterol. Dilutions up to 1/4000 can be measured. The exp 13 C enriched faecal cholesterol is converted into CO sub 2 and the exp 13 C/ exp 12 C ratios are measured on a dual collector mass spectrometer. Dilutions up to 1/5000 of the 3,4 exp 13 C cholesterol can be detected. The details of the analytical procedure are given. (Atomindex citation 11:525309)

CEA-R-5007 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Metabolism of exp 14 C-1 Labelled Glucose in the Rat. A Radiation Protection Approach.
L. Jeanmaire, Y. Vernois, and R. Nazard. Nov 79, 26p
In French.
U.S. Sales Only.

The metabolism of exp 14 C-1 labelled glucose was studied in the rat during 620 d. The results concerning (1) elimination by the exhalated air, urine and feces, (2) activity uptakes in 25 tissues or organes, (3) cumulated activity from the 4th to the 627 d are presented and discussed. About 50% of the activity is eliminated as CO sub 2 in the 24 first hours, the remaining is eliminated more slowly. Some tissues such as bone and spinal cord have especially long retention half-lives. Consequently the dose delivered to these tissues is higher by a factor 10. In man, the dose should be generally around 10 exp -4 rem per mu Ci of C-1 glucose administered. (Atomindex citation 11:525227)

N81-15659/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Excessive Saccharose Administration on Metabolic Processes in the Liver of Rabbits with Restricted Mobility.
Y. P. Rylnikov. Aug 80, 13p NASA-TM-76331
Contract NASW-3199
Transl. Into English from Kardiologiya (USSR), V. 20, No. 4, Apr. 1980 p 75-80. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Yaroslav Medical Inst.

The administration of saccharose (3 g per 1 kg for 2 months) intensified changes encountered in hypokinesia. There was a more marked increase in the content of cholesterol, pre-beta and beta-lipoproteins, phospholipids, and glycosaminoglycans in the blood. At the same time, the administration of saccharose improved the course of metabolic processes in the liver of immobilized rabbits, restored to normal levels the reduced glycogen level, the rate of glycolysis and the conversion of cholesterol to bile acids and their discharge in the cystic bile.

N81-15660/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Responses of the Frog Primary Vestibular Afferents to Direct Vibration of the Semicircular Canal.
I. V. Orlov. Sep 80, 16p NASA-TM-76332
Contract NASW-3199
Transl. Into English from Fiziol. Zh. SSSR im. I. M. Sechenova, (USSR), V. 66, No. 1, 1980 p 48-55. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By USSR Academy Science, Leningrad.

Responses of primary afferents (PA) of lateral semicircular canal to sinusoidal vibration of the canal wall within the range 0.05-200 Hz (mean amplitudes 5-15 microns) in immobilized frogs were studied. Dynamic characteristics (gain, phase) of relative linear velocity of the vibrator (micron X/s) were examined. At 0.2 Hz, the gain was 5.35 + or - 3.19 imp X/s /micron X/s (mean; S.D.; n=14) and linearly decreased if the frequency rose. Phase lag of relative velocity at 0.05 Hz was 49.8 deg + or - 16.5 deg (n=13) and at 1 Hz 97 deg + or - 9.4 deg (n=22). At 100 Hz phase lag was about 240 deg. Three groups of PA are described: wide range PA reacting in the range from 0.05 up to 60-180 Hz; high frequency PA responding in the range from 20-40 up to 100-150 Hz; and low frequency PA responding in the range from 0.05 up to 2-20 Hz.

N81-15681/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
State of Gas Exchange in Recumbent and Orthostatic Positions and under Physical Load in Healthy Persons of Varying Age, Sex and Body Build.
G. A. Glezer, M. Charyyev, and N. L. Zilbert. Sep 80, 7p NASA-TM-76357
Contract NASW-3199
Transl. Into English from Zdravookhraneniye Turkmenistana (USSR), V. 33, No. 10 Oct. 1979 p 24-27. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Age effect on gas exchange was studied in the recumbent and orthostatic positions and under physical load. In the case of the older age group and for normal as compared with hypersthenic persons, oxygen consumption during rest and during moderate physical overload diminishes. When the vertical position is assumed oxygen consumption in persons of various age groups is distinctly increased, particularly in the elderly group. There is a reduction in the amount of oxygen consumption, oxygen pulse, recovery coefficient, and work efficiency under moderate overload. In persons over 50, physical labor induces a large oxygen requirement and a sharp rise in the level of lactic acid and the blood's lactate/pyruvate ratio. No distinct difference was noted in the amount of oxygen consumed during rest and during physical overload in men and women of the same physical development and age.

N81-15686/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Significance of Vestibular and Proprioceptive Afferentation in the Regulation of Human Posture.
V. S. Gurfinkel. Dec 80, 12p NASA-TM-76470
Contract NASW-3198
Transl. Into English of "Znacheniye Vestibulyarnoy I Propriotseptivnoy Afferentatsii V Regulyatsii Pozy Cheloveka" Moscow, 1980 10 p. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original Document Prep. By Ministry of Health of the USSR, Moscow. Presented at the 11TH Joint Soviet-AM. Working Group on Space Biol. And Med., Moscow, Oct. 1980.

Viewpoints on the vertical human posture and the relation between postural adaptation during voluntary movements and the guarantee of stable locomotor movements are examined. Various complex sensory systems are discussed.

N81-15687/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Functional Asymmetry of Posture and Body System Regulation.
V. N. Boloban, and A. P. Otsupok. Sep 80, 11p
NASA-TM-76401
Contract NASW-3199
Transl. Into English from Teor. Prakt. Fiz. Kultury (USSR), No.10, Oct. 1979 p 6-10. Transl. By Kenner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Kiev State Inst. Of Physical Culture.

The manifestation of functional asymmetry during the regulation of an athlete's posture and a system of bodies and its effect on the execution of individual and group acrobatic exercises were studied. Functional asymmetry of posture regulation was recorded in acrobats during the execution of individual and group exercises. It was shown that stability is maintained at the expense of bending and twisting motions. It is important to consider whether the functional asymmetry of posture regulation is left or right sided in making up pairs and groups of acrobats.

6R. Radiobiology

AD-A093 662/5 PC **A02**/MF **A01**
Technology, Inc., San Antonio, TX. Life Sciences Div.
Retinal Lesions Due to Ultraviolet Laser Exposure,
Robert E. Schmidt, and Joseph A. Zuclich. 7 Jul 79, 12p SAM-TR-79-317
Contract F33615-77-C-0615
Pub. in Investigative Ophthalmology and Visual Science, v19 n10 p1166-1175, Oct 80.

No abstract available.

AECL-6482 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Nuclear Power and Low Level Radiation Hazards.
D. K. Myers, and H. B. Newcombe. Mar 79, 16p CONF-7811169-1
Symposium on CANDU reactor safety design, Toronto, Canada, Nov 1978.
U.S. Sales Only.

Even in the future, nuclear power is expected to contribute less than 1/10th of the present total population exposure to man-made radiation. By the best estimates available, the current health risks of nuclear power generation appear to be much less than those associated with the major alternative sources of energy, with the exception of natural gas which is about equally safe. Uncertainties concerning the radiation risks from nuclear power, from medical x-rays and from the effects of reduced ventillation to conserve heat appear to be less than those associated with estimates of risks from the use of coal and various other sources of energy. This is in part because of the large amount of effort devoted to studies of radiation effects. The benefits in terms of current life expectancy associated with any of the conventional or unconventional methods of power production appear to greatly outweigh the associated current health hazards. (Atomindex citation 11:521873)

AECL-6541 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Health Aspects of Low-Level Radiation.
A. M. Marko. Jun 79, 8p CONF-7903131-1
Canadian Electrical Association conference, Vancouver, Canada, 26 Mar 1979.
U.S. Sales Only.

A brief description of natural background radiation is given. To understand the relationship between doses and effects the magnitude and distribution over time are stressed. The derivation of radiation protection standards and corresponding risks are discussed. The risks to the occupational worker and to the public from nuclear power are placed in context of risks in other industries and from alternate energy sources, including conservation. (Atomindex citation 11:521870)

ASEA-ATOM-RF-79-180 PC **A10**/MF **A01**
ASEA-ATOM A.B., Vaesteraas (Sweden).
Personnel Radiation Safety in Nuclear Power Plants.
J. Elkert. May 79, 209p
In Swedish.
U.S. Sales Only.

The principal contributions to the radiation doses of the Swedish power reactor personnel are identified. The possibilities to reduce these doses are examined. The radiation doses are analyzed according to different personnel categories, specific maintenance operations or inspections and to different radiation activities. Suggestions are given for reducing the radiation doses. (Atomindex citation 11:525371)

CEA-CONF-4857 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
New Trends in Radiation Protection Defined by the International Commission of Radiological Protection (ICRP) And Their Practical Consequences.
H. Joffre. 1979, 21p CONF-7909146-1
In French.11. national congress on the control of ionizing radiation, Nantes, France, 18 Sep 1979.
U.S. Sales Only.

The new terminology has the advantage of being simpler than before and expresses more accurately the quantities involved. Although they distinguish between random and non-random effects the new dose limits are fewer than the old. The average limit 5(N-18) and three-month limits have been abolished, while the dose limits for partial irradiation have the same value for all tissues (50 rem) except the crystalline lens (30 rem). The notion of effective dose corresponds to a logical necessity; it enables the non-homogeneous irradiation of the organism to be interpreted rationally, especially in cases of internal irradiation, the mere addition of the previous CMA or CMA.m exp 3 concerning several radionuclides present in air or water being illogical unless the most exposed organ is the same for all the radionuclides involved. The total irradiation limits are maintained. On the other hand the partial irradiation limits are on the whole less strict for external irradiation and, though to a lesser degree, for internal irradiation, as shown by comparison of the old CMA and the new concentration limits in air or water. The Commission has made few changes in the dose limit values in general. However the biological foundations of dose restriction have been completely revised; they are better defined, especially by the distinction made between random and non-random biological effects. The emphasis on the importance of random effects and the precautionary measures adopted by the Commission in the face of remaining difficulties show that the new recommendations represent an upper limit in the evaluation of risks attached to the use of ionising radiations; these precautionary measures may be an important safety factor in the case of radiations with a low LET. (Atomindex citation 11:525403)

CEGB-RD/B/N-4629 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Proposed Experiments for Assessing the Potential Use of Skin as an Indicator of sub-Erythemal Radiation Exposure.
J. Wells, and M. W. Charles. Aug 79, 8p
U.S. Sales Only.

Several biological systems have been developed in recent years for radiation dosimetry. They have proved to be useful in accident situations or when the result of personal dosemeter assessment is equivocal. A review of a range of biochemical and biophysical dosimetry techniques indicates that none are ideally suited for dose assessment in the sub-erythemal range (< 2 Gy) when a high non-uniform or partial body exposure is involved. This important practical situation could be met by the development of a biological dosimetry system based upon the response of skin. A programme of study has been agreed upon to investigate this possibility. A resume of a 1 year pilot study supported by the CEGB is presented, the results of which will be described in due course. (Atomindex citation 11:525078)

DOE/AL/10752-5 PC **A05**/MF **A01**
New Mexico Health and Environment Dept., Santa Fe.
Calculated Radiation Doses from Deposition of Material Released in Hypothetical Transportation Accidents Involving WIPP-Related Radioactive Wastes.
J. K. Channell. Oct 80, 76p
Contract AC04-78AL10752

A severe transportation accident resulting in the release of radioactive material during WIPP site operation is unlikely, but possible. Radioactive material deposited on the ground following an accident could deliver a radiation dose to people from the following pathways: (1) ingestion of contaminated food, milk or water; (2) inhalation of deposited material that is resuspended; (3) external radiation from material remaining near the surface. The total dose from these pathways may occur over a period of many years. This report presents the results of an analysis that estimates the maximum short-term (first year) and lifetime (70 years) doses that exposed individuals might receive. Also, the population doses that would result from contamination of irrigated food and animal feed crops are estimated. The expected reduction of these doses by protective actions was also considered. (ERA citation 06:004597)

INIS-mf-5748 PC **A05**/MF **A01**
National Radiological Protection Board, Harwell (England).
Application or Cost-Benefit Analysis to the Radiological Protection of the Public. A Consultative Document.
Mar 80, 83p
U.S. Sales Only.

The subject of this document is the quantification of the potential harm caused to the general public by ionising radiation in normal operating circumstances. The object is to enable the health detriment from a practice involving exposure to ionising radiation to be directly compared with the costs of keeping the ensuing doses as low as reasonably achievable. Chapter headings include: development of radiological protection criteria; principles underlying the valuation of harm from radiation exposure; risk evaluation approach to costing of detriment; monetary valuations; distribution of costs and risk in time. Appendices cover the following: cost benefit analysis (principles); recommendations of ICRP on the use of cost benefit analysis; life valuation studies (review); application of cost benefit analysis to the value of the man sievert. (Atomindex citation 11:528112)

JAERI-M-8481 PC **A08**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
ANDOSE: A Computer Code for Calculating Annual Doses to Man from Routine Releases of LWR Effluents for the Purpose of Evaluating Compliance with JAEC'S Guide for Dose Objectives.
T. Iijima, and T. Shiraishi. Oct 79, 163p
In Japanese.
U.S. Sales Only.

For environmental doses from routine releases of LWRs effluents to meet the Criterion 'As Low As is Practicable (ALAP)', Japan Atomic Energy Commission (JAEC) established a series of guides, the first for 'Dose Objectives' (May 1975), the second for models and parameters for calculating the environmental doses to compare with the 'Dose Objectives' (September 1976), and the third providing onsite meteorological programs, statistics of the data obtained and atmospheric dispersion models (June 1977). JAERI has developed a computer code, designated as ANDOSE, for calculating annual releases of radioactive gaseous and liquid effluents and, then, total body doses and thyroid doses to individuals around sites on the basis of these guides. The total body doses are from radioactive noble gases as well as from radioactive materials taken with marine food. For the calculation of thyroid doses are taken into account exposure pathways via inhalation and ingestion of leafy vegetables, cow's milk and marine food. The age-specific thyroid doses are evaluated. The doses are summed up when multisource or multisite conditions need to be evaluated (Nuclear Safety Bureau's requirement). In the present report are described source-term models, environmental transport models and dose models used in the code, of which most are provided in the guides but some are complemented by the authors, the functions of ANDOSE and the manual for users of the code. The program lists and the latter two guides mentioned above are included in the appendices. (Atomindex citation 11:526137)

NRPB/RandD-3 PC **A11**/MF **A01**
National Radiological Protection Board, Harwell (England).
Annual Research and Development Report, 1978.
Jun 79, 249p
U.S. Sales Only.

The work of the National Radiological Protection Board is reviewed under the following headings:- deposition and clearance of radioactive materials from lungs, metabolism and effects of incorporated radionuclides, removal of incorporated radionuclides, radioactivity in the environment, radiation-induced chromosome aberrations in human peripheral blood, biological effects of microwaves, calculations of radiation dose and risk, inhalation of radon and daughter products, doses to patients, personal monitoring, radiation physics and a national registry for radiation workers. (Atomindex citation 11:526150)

NRPB-R-89 PC **A03**/MF **A01**
National Radiological Protection Board, Harwell (England).
General Model for the Transfer of Radioactive Materials in Terrestrial Food Chains.
J. R. Simmonds, G. S. Linsley, and J. A. Jones.
Sep 79, 43p
U.S. Sales Only.

A general methodology for modelling the transfer of radionuclides in the food chains to man is described. The models are dynamic in nature so that the long-term time dependence of processes in environmental materials can be represented, for example, the build-up of activity concentrations in soils during continuous deposition from atmosphere. Modules for radionuclide migration are described in well-mixed (cultivated) soil and undisturbed soil (pasture). The methods by which the transfer coefficients used in plant and animal modules are derived are also given. The foodstuffs considered are those derived from green vegetables, grain, and root vegetables together with meat and liver products from the cow and sheep and cow dairy products. The dynamic model permits the time dependence of food chain transfer processes to be represented for different land contamination scenarios; in particular, the model can be adapted to represent behaviour following a single deposit. Using the sensitivity of results to the variation of transfer parameters the model can be used to determine the parts of the food chain where improved data would be most effective in increasing the reliability of radiological assessments; a worked example is given. (Atomindex citation 11:521917)

NUREG/CR-1801 PC **A03**/MF **A01**
Argonne National Lab., IL.
Light-Water-Reactor Safety Research Program.
Quarterly progress rept. Apr-Jun 80,
Walter E. Massey, and Charles E. Till. Jan 81, 42p ANL-80-107
See also report for Jan-Mar 80, NUREG/CR-1691.

This progress report summarizes the Argonne National Laboratory work performed during April, May, and June 1980 on water-reactor-safety problems. The research and development area covered is Transient Fuel Response and Fission-product Release.

NUREG-0593 PC **A06**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Management and Program Analysis.
Occupational Radiation Exposure.
Annual rept. no. 11 for 1978,
B. Brooks, S. McDonald, and E. Richardson. Jan 81, 123p
See also Rept. no. 10, PB-288 247.

This report summarizes the information reported for calendar year 1978 by all NRC licensees to the

Commission's centralized repository of personnel occupational radiation exposure information. The bulk of the information in the report is derived from annual reports that were required to be submitted by all NRC licensees pursuant to 10CFR 20.407. Previously only certain categories - commercial nuclear power reactors, industrial radiographers, fuel fabricators and processors and commercial distributors of byproduct materials - of NRC licensees had submitted such reports. The requirement of 10CFR 20.408 for the submission of termination reports continued to apply to only these four categories, and some analysis of the data contained in these reports is also presented. A brief description of personnel overexposures reported by NRC licensees is included as well.

NUREG-0636 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
The Public Whole Body Counting Program Following the Three Mile Island Accident.
Technical rept. Apr-Sep 79,
R. L. Gotchy, and R. J. Bores. Dec 80, 61p

In early April, 1979 the U.S. Nuclear Regulatory instituted a program to determine whether any radioactivity released as a result of the March 28, 1979 accident at the Three Mile Island Unit-2 was accumulating in members of the general public living near Unit-2. The program used a device called a whole body counter which has the capability of measuring very small quantities of radioactivity in people. There were 753 men, women and children successfully counted; nine of these people were counted a second time, leading to a total of 762 whole body counts. There was no radioactivity identified in any member of the public which could have originated from the radioactive materials released following the accident. Several people with higher than average levels of naturally occurring radioactivity were identified. The counting systems used are briefly described. Technical problems encountered, results and conclusions are discussed.

N81-15661/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Combined Effects of Ionizing Radiation and Weightlessness on Calcium and Phosphorus Content in the Mineral Fraction of the Calcified Tissues in the Rat Skeleton.
A. A. Prokhonchukov, N. A. Komissarova, A. G. Kolesnik, and L. L. Novikov. Aug 80, 7p NASA-TM-76342
Contract NASW-3199
Transl. Into English from Radiobiol. (USSR), V. 19, No. 5, 1979 p 760-762. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Phosphorus and calcium content in the ash from skeletal bones (ribs, scapula, vertebra, and crus) of 30 rats exposed to ionizing radiation (800 rads) on the flight of the Kosmos 690 biosatellite was studied. A 10 percent decrease in ash content coefficient and 29 percent decrease in phosphorus content was found immediately after the flight, and a 9 percent decrease in phosphorus content persisted after 26 days of readaptation to terrestrial conditions.

N81-15688/7 PC **A03**/MF **A01**
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Influence of TL-Light on Man Invloed van TL-Verlichting OP de Mens.
A. C. M. Vanderdrift, and W. J. C. Bogaerts. Aug 79, 34p MBL-1979-4
In Dutch; English Summary.

On the basis of a critical evaluation of the data a qualitative analysis is given of the risks which exposure to TL-illumination may bring about for human health, particularly for the health of employees who are nearly continuously exposed to this type of light during everyday work. It was concluded that prolonged exposure to a normal and properly installed TL-lighting does not involve significant risks for the health of man, certainly when compared to the risks connected with even a relatively short exposure to sunlight.

PB81-935500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Radiation Carcinogenesis.
Cancergram CK06.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram deals with all aspects of radiation carcinogenesis. The term 'radiation' here includes U-V radiation and the entire electromagnetic spectrum, electron and other charged particle beams, neutrons, and alpha and beta radiation from radioactive substances. Abstracts included concern relationships between radiation and carcinogenesis in humans, experimental induction of tumors in animals by irradiation, studies on the mechanism of radiation carcinogenesis at the cellular level, studies of RBE, dose response or dose threshold in relation to radiation carcinogenesis, and methods and policies for control of radiation exposure in the general population. In general, this Cancergram excludes abstracts on radiotherapy, radiologic diagnosis, radiation pathology, and radiation biology, where these articles have no bearing on radiation carcinogenesis.

UCRL-84927 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Radiological Considerations of Phosphogypsum Utilization in Agriculture.
C. L. Lindeken. 31 Oct 80, 22p CONF-801161-1
Contract W-7405-ENG-48
International symposium on phosphogypsum, Lake Buena Vista, FL, USA, 5 Nov 1980.

The radiological concerns associated with phosphogypsum utilization in agriculture have been placed in perspective by considering the consequences of a hypothetical case involving heavy long term applications of phosphogypsum. In California, such a schedule might consist of an initial gypsum application of 10 tons/acre followed by alternate year applications of 5 tons/acre. If the radium content of the gypsum were 15 pCi/g and the till depth 6 inches, this schedule could be maintained for more than 100 years before the radium buildup in the soil would reach a proposed federal concentration limit of 5 pCi/g. An agricultural worker spending 40 h a week in a field containing 5 pCi/g of radium would be exposed to terrestrial radiation of about 7 mu R/h above background. This exposure would result in an annual radiation dose of about 15 mrem, which is 3% of the recommended limit for an individual working in an uncontrolled area. Five pCi/g of radium in the soil could generate airborne radon daughter concentrations exceeding the concentration limit proposed for residential exposure. However, as residential exposure limits are predicated on 75% of continuous occupancy, these limits should not be applied to agricultural workers because of the seasonal nature of their work. Radium uptake by food crops grown in the hypothetical soil would result in a 50 year integrated dose to the bone surface of 1.4 rem. This dose is conservatively based on the assumption that an adult's total vegetable diet comes from this source and that consumption was continuous during the 50 year period. (ERA citation 06:006638)

6S. Stress Physiology

AD-A093 668/2 Not available NTIS
Hawaii Univ. Medical School, Honolulu. Dept. of Physiology.
Measurement of Oxygen Consumption in Scuba Divers Working in Open Water,
Jeffrey Dwyer. 1977, 12p
Contract N00014-77-C-0144
Availability: Pub. in Ergonomics, v20 n4 p377-388 1977 (No copies furnished by DTIC/NTIC).

No abstract available.

AD-A093 706/0 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
The Impact of Remote Fly-Away Submersible Operations on Personnel Endurance Capabilities.
Interim rept.,
David A. Hall, Richard E. Townsend, John Knippa, and Richard Pruett. Jan 80, 12p Rept no. NAVHLTHRSCHC-79-52

To obtain information on stress, fatigue, and work-rest cycles of submersible operators and system support personnel members during an actual submarine rescue fly-away mission, 17 fly-away team members were monitored during the conduct of a 10-day simulated open-sea submarine rescue using the Deep Submergence Rescue Vehicle (DSRV), AVALON. Operators and crew members lived aboard the mother submarine which carried the DSRV from port to the site of the downed submarine and return. Demographic information, psychological measures, and environmental data were obtained during baseline, transit-out, in-port, and dive periods. The overall results supported previous findings, suggesting that a DSRV mission of the present duration and difficulty can be accomplished without exceeding the capabilities of the crew and support personnel. The trend of the changes, does, however, suggest that missions of longer duration may require scheduling of regular sleep periods for personnel to maintain performance. (Author)

AD-A093 827/4 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
The ISO Standard Guide for the Evaluation of Human Exposure to Whole-Body Vibration,
Henning E. von Gierke. Nov 75, 10p Rept no. AFAMRL-TR-75-17
Presented at the Society of Automotive Engineers Truck Meeting, Philadelphia, PA., 10-13 Nov 75, Paper No. 751009.

This paper was prepared by invitation as discussion of SAE Paper 750166 by R.N. Janeway, 'Human Vibration Tolerance Criteria and Application to Ride Evaluation,' presented at SAE Automotive Engineering Congress, February 1975. It discusses the present ISO Guide for the Evaluation of Human Exposure to Whole-Body Vibration, which is based on all relevant information presently available and which reflects the best judgement of all international experts and all disciplines involved. (Author)

N81-15663/0 PC **A02**/MF **A01**
San Francisco State Univ., CA. Dept. of Biological Sciences.
Effects of Centrifugation on Gonadal and Adrenocortical Steroids in Rats.
Final rept., 1 Nov. 1979 - 31 Oct. 1980.
R. Kakihana, and J. C. Butte. 31 Oct 80, 16p
NASA-CR-163858
Contract NCC2-25

Many endocrine systems are sensitive to external changes in the environment. Both the pituitary adrenal and pituitary gonadal systems are affected by stress including centrifugation stress. The effect of centrifugation on the pituitary gonadal and pituitary adrenocortical systems was examined by measuring the gonadal and adrenal steroids in the plasma and brain following different duration and intensity of centrifugation stress in rats. Two studies were completed and the results are presented. The second study was carried out to describe the developmental changes of brain, plasma and testicular testosterone and dihydrotestosterone in Sprague Dawley rats so that the effect of centrifugation stress on the pituitary gonadal syatem could be better evaluated in future studies.

N81-15671/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Water Metabolism Regulating Mechanisms in Hypokinesia.
V. P. Krotov. Aug 80, 8p NASA-TM-76309
Contract NASW-3199
Transl. Into English from Patol. Fiziol. Eksp. Ter., No. 1, Jan. - Feb. 1980 p 15-18. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By USSR Ministry of Health.

The range of daily fluctuations of the proportion of the amount of consumed water and its content in the body was evaluated by means of a water metabolism regulation factor. This index constitutes a relative measure of fluctuations of the constant of tritium water elimination from the body per 24

hours. It is established that under conditions of long term hypokinesia regulation of water metabolism is disturbed both in humans and in animals. Still more marked changes are observed 2 to 3 weeks after restoration of motor activity. The shifts noted are evidence of general biological regularity of disturbance of regulation systems in long term restriction of motor activity and in the early restoration period.

N81-15673/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Local Redistribution of Blood under the Effect of Fixation Stress Against a Background of Hypokinesia.
O. A. Kovalev, V. F. Lysak, V. I. Severovostokova, and S. K. Shermetevskaya. Aug 80, 12p NASA-TM-76322
Contract NASW-3199
Transl. Into English from Ziol. Zh. (USSR), V. 26, No. 1, Jan. - Feb. 1980 p 120-124. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Doctors' Training Inst., Leningrad.

Fixation stress was used as a model of emotional disturbance. The effect of previous restrictions on mobility on the local redistribution of blood resulting from fixation stress was examined. Disturbances in carbohydrate which result from prolonged hypokinesia was studied. Radioactivity was used to determine the local redistribution of blood. Modified factor analysis was used to study the results of the experiment.

N81-15680/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Long-Term Hypokinesia on the Electrolytic Composition of the Blood in Patients with Osteoarticular Tuberculosis.
V. P. Zakutaeva. Sep 80, 7p NASA-TM-76325
Contract NASW-3199
Transl. Into English from Zdravookhr. Kirgizii (USSR), No. 3, May - Jun. 1978 p 32-35. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Seventy-six patients with osteoarticular tuberculosis were divided into two groups, one of which was required to maintain strict bed rest and the other of which was allowed unrestricted motor activity. A study of blood electrolyte composition in the two groups revealed that bed rest for these patients results in decreased plasma potassium calcium, and magnesium content, but that these indices improved after the patients were allowed to move freely. The study suggests that patients with osteoarticular tuberculosis who are on bed rest be carefully observed for alterations in blood electrolytes and that proper electrolyte balance be maintained.

N81-15685/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Mechanisms for Vestibular Disorders in Space Flight. Facts and Hypotheses.
E. I. Matsnev. Dec 80, 31p NASA-TM-76469
Contract NASW-3198
Transl. Into English of "Mekhanizmy Vestibulyarnykh Narusheniy V Kosmicheskom Polete. Fakty I Gipotezy" Rept. USSR Ministry of Health, Moscow. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By USSR Ministry of Public Health. Presented at 11TH Joint Soviet-AM. Working Group on Space Biol. And Med., Moscow, Oct. 1980 p 1-33.

This article discusses the vestibular disorders associated with space flight. It is found there is still no complete understanding of the changes occurring in the sensory systems of the body during weightlessness. Results of studies are presented, including results of a ground model.

PB81-803645 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Behavior and Physiological Effects of Noise. 1977-February, 1981 (Citations from the NTIS Data Base).
Rept. for 1977-Feb 81.
Feb 81, 262p
Supersedes PB80-803869, and NTIS/PS-79/1014. See also 1964-1972, NTIS/PS-76/0013, 1972-1976, NTIS/PS-78/0037.

Research reports are cited on the medical, psychological, and physiological problems of noise pollution. Human tolerances to noise from aircraft, community traffic, industry, and military weapons are discussed. Reports on protective measures, noise control and abatement are also included. (This updated bibliography contains 254 citations, 71 of which are new entries to the previous edition.)

6T. Toxicology

AD-A093 673/2 MF **A01**
Science and Education Administration, College Station, TX. Veterinary Toxicology and Entomology Research Lab.
Toxicologic Evaluation and Fate of Diisopropyl Methylphosphonate (DIMP) and Dicyclopentadiene (DCPD) in Cattle.
Final project rept. Mar 77-Sep 79,
J. S. Palmer, S. J. Cysewski, H. R. Crookshank, E. G. Stell, and G. W. Ivie. Sep 79, 99p
Availability: Microfiche copies only.

The toxicological and metabolic behavior in cattle of the environmental contaminants diisopropyl methylphosphonate (DIMP) and dicyclopentadiene (DCPD) have been investigated. DIMP is slightly toxic to calves, with an acute oral LD50 of about 750 mg/kg of body weight. Some hematological, clinical chemistry, and pathological changes were observed as a result of both toxic and subtoxic DIMP doses to the calves. These included certain cerebral, renal, and gastro intestinal lesions. Metabolism studies with (14C)DIMP in a lactating cow showed that DIMP is rapidly and almost quantitatively metabolized in cattle by a single mechanism-hydrolysis of one of the isopropyl ester linkages. Residues were neither retained by the tissues nor secreted into milk to an appreciable extent. The acute oral LD50 of DCPD to calves is on the order of 1200 mg/kg of body weight. DCPD, particularly at higher dosages, caused some hematological changes. Gross pathologic changes consisted primarily of congestion of a number of tissues at the higher dosage levels. Major histological changes occurred mostly in cerebral, renal, and hepatic tissues. (14C)DCPD was rapidly metabolized and excreted by a lactating cow, with little of the residue being secreted into milk. More than a dozen metabolites were excreted by the DCPD treated cow, and most appeared to be in the form of glucuronide conjugates. These studies suggest that exposure of cattle to low levels of DIMP or DCPD in the environment will result neither in toxicological hazards to the exposed animal nor in hazards to humans through the consumption of meat or milk. (Author)

AD-A093 854/8 Not available NTIS
Naval Biosciences Lab., Oakland, CA.
Comparative Study of the Acute Toxicity of a Homologous Series of Trialkyltins to Larval Shore Crabs, Hemigrapsus nudus, and Lobster, Homarus americanus,
Roy B. Laughlin, Jr, and Willie J. French. 1980, 8p
Availability: Pub. in Bulletin of Environmental Contamination and Toxicology, v25 p802-809 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

NUREG/CR-1297 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Toxicity, Bioaccumulation and Depuration of Bromoform in Five Marine Species: 'Prototh-aca stamineae', Littleneck Clam, 'Mercenaria mercenaria', Eastern Hard Clam, Quahog, 'Crassostrea virginica', Eastern Oyster, 'Penaeus aztecus', Brown Shrimp, 'Brevoortia tyrannus', Atlantic Menhaden,
C. I. Gibson, F. C. Tone, P. Wilkinson, J. W. Blaylock, and R. E. Schirmer. Jan 81, 53p PNL-3157

Bromoform has been identified as the single most abundant halogenated organic compound produced by the chlorination of marine waters. To determine the potential biological effects of its release into marine waters, short-term toxicity bioassay and 28-day uptake/28-day depuration studies were conducted with five marine species: Protothaca staminea, Mercenaria mercenaria, Crassostrea virginica, Penaeus aztecus, and Brevoortia tyrannus. These species have commercial and economic importance and are often found in the vicinity of discharge streams from nuclear fueled steam electric stations.

NUREG/CR-1741 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Models for the Estimation of Incapacitation Times Following Exposures to Toxic Gases or Vapors,
Gordon J. Smith, and David E. Bennett. Feb 81, 45p SAND-80-2226

A single relationship to predict human incapacitation from exposure to a wide range of toxic gases or vapors is not feasible. Based on the various physiological and toxicological effects that can occur, a set of four models was developed to predict the time to incapacitation. The four models encompass the range of effects which can lead to immediate incapacitation: (1) Concentration dependent - immediate sensory irritant. (2) Dual concentration/dose dependency - immediate sensory irritant and/or delayed pulmonary effects. (3) Dose dependent - related to concentrations exceeding the Threshold Limit Value. (4) Dose dependent - related to concentrations exceeding an onset level for significant and immediate toxicological effects which are incapacitating in nature. These models use historical accident data from incapacitating human exposures or experimentally determined incapacitation data for animals.

N81-15678/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
On the Mechanisms of Harmful Effects of Certain Medicinal Preparations on the Auditory Organ and Methods for Their Prevention.
E. A. Bakay. Nov 80, 26p NASA-TM-76425
Contract NASW-3198
Transl. Into English from Zh. Ushnykh, Nosovykh Bolezney (USSR), No. 5, Oct. - Nov. 1979 p 78-84. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Various drugs are discussed and many references are mentioned. It was concluded that the development of methods of pharmacological prevention of the harmful effect of drugs on the auditory analyzor is a necessity.

ORNL/EIS-151 PC **A18**/MF **A01**
Oak Ridge National Lab., TN.
Scientific Rationale for the Selection of Toxicity Testing Methods: Human Health Assessment.
R. H. Ross, M. G. Ryon, M. W. Daugherty, J. S. Drury, and J. T. Ensminger. Dec 80, 423p EPA-560/1-80-001
Contract W-7405-ENG-26

This document is the first of a two-part literature analysis of parameters associated with the various toxicity testing methods (test animal selection, pathology requirements, etc.). Acute, subchronic, chronic, and carcinogenic testing methods are covered; a discussion of some basic experimental considerations is also included. This report was prepared for the purpose of assisting and supporting the US Environmental Protecton Agency in its efforts to develop guidelines for more efficient and economical testing procedures. (ERA citation 06:006648)

PB81-147142 PC **A04**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Chemical and Physical Characterization of Amosite, Chrysotile, Crocidolite, and Nonfibrous Tremolite for Oral Ingestion Studies by the National Institute of Environmental Health Sciences.
Rept. of investigations/1980,
William J. Campbell, Charles W. Huggins, and Ann G. Wylie. 1980, 70p BUMINES-RI-8452

The Federal Bureau of Mines provided five test materials--amosite, short and long-fiber chrysotile,

crocidolite, and nonfibrous tremolite--to the National Institute of Environmental Health Sciences (NIEHS) for studies on the biological effects of orally ingested asbestos-related materials. An interagency agreement between the Bureau and NIEHS made possible this program to characterize these test materials. The Bureau in turn received support through contracts with the Ontario Research Foundation for the milling of amosite and crocidolite, and with the University of Maryland for microscopic measurements. The five test materials, which were supplied in quantities of 960 to 1,200 pounds each, were characterized by chemical-instrumental analysis for elemental composition, surface area, density, X-ray diffraction, infrared spectroscopy, thermogravimetric analysis, mineralogy, and particle size analyses. Particle size distributions were emphasized because of the current theories relating adverse biological effects to length-width characteristics of durable elongated particles.

PB81-147373 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
State Administrative Models for Toxic Substances Management. Toxics Integration Policy Series,
Barbara Faust, and Murray Newton. Jul 80, 29p EPA-560/13-80-018

This paper describes examples of State administrative responses to toxic substances problems. It is an initial effort in a continuing exploration of Federal-State cooperation for toxic substances control. The authors hope the products of this new focus will provide useful information to States about State problems and programs. Through continued information exchange and legislative policy analysis, the Program Integration Division (PID) plans to assist States to develop their own toxic substances strategies. These strategies when implemented in cooperation with EPA's Regional Offices enhance the probability of successful, nationwide toxic substances management.

PB81-148454 PC **A02**/MF **A01**
Health Effects Research Lab., Cincinnati, OH.
Arterial Blood Gases, Pulmonary Function and Pathology in Rats Exposed to 0.75 or 1.0 ppm Ozone.
Journal article,
William E. Pepelko, Joan K. Mattox, and You Yen Yang. 1980, 14p EPA-600/J-80-179
Pub. in Jnl. of Environmental Pathology and Toxicology 3, p247-259 1980.

Arterial blood gases, residual lung volume (RV), deflation pressure volume (PV) curves, pulmonary pathology and body weight changes were studied in rats exposed up to 14 days to either 0.75 or 1.0 ppm ozone. Arterial PO2 and body weights decreased progressively with length of exposure while PaCO2 and RV increased. The slope of the PV curve decreased in all groups exposed to ozone. Pathological changes in the lung increased in severity with concentration and length of exposure. The present findings have shown that arterial blood gas measurements represent a sensitive index of altered lung function in rats, a species very sensitive to ozone exposure.

PB81-148884 PC **A02**/MF **A01**
Massachusetts Univ., Amherst.
Elevated Levels of Sodium in Community Drinking Water.
Journal article,
Edward J. Calabrese, Robert W. Tuthill, Janelle M. Klar, and Thomas L. Sieger. Nov 80, 7p EPA-600/J-80-204
Grant EPA-R-805612-02
Pub. in Jnl. AWWA 72, n11 p645-647 Nov 80.

A comparison study of students from towns with differing levels of sodium in drinking water revealed statistically significantly higher blood pressure distributions among the students from the town with high sodium levels. Differences were found in both systolic and diastolic readings, in boys as well as girls.

PB81-149122 PC **A02**/MF **A01**
Environmetrics, Inc., St. Louis, MO.
A Personal Dosimeter for Monitoring Exposure to Waste Anesthetic Gases,
Eugene P. Scheide, and Mario Vaenberg. Apr 80, 24p NSF/RA-800318
Grant NSF-PFR79-17110

A simple and inexpensive method for measuring time-weighted average concentrations of breathing zone samples of the primary waste anesthetic gas in hospital operating rooms is described. A personal dosimeter similar to a radiation film badge has been developed that can be worn on the coat lapel. The waste anesthetic gases being sampled diffuse into the dosimeter and are adsorbed onto a solid collection element. Later analysis of this substrate by electron-capture gas chromatography gives the time-weighted average concentration of the contaminant being monitored. The badge has been developed to monitor nitrous oxide exposures and has shown a linear response to concentrations between 2.5 and 15 ppm nitrous oxide. It is currently being evaluated at other nitrous oxide concentrations as well as being generalized to be used to monitor for other waste anesthetic gases.

PB81-150765 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park. Center for Air Environment Studies.
Sensitive Biochemical and Behavioral Indicators of Trace Substance Exposure. Part 1. Cerium,
Edward J. Massaro, John B. Morganti, Bradley A. Lown, Carl H. Stineman, and Rosemary B. D'Agostino. Jan 81, 73p EPA-600/1-81-011
Contract EPA-68-02-1768
Prepared in cooperation with State Univ. of New York at Buffalo.

At various times after exposure of the adult mouse to single or repeated (multiple) doses of Cerium (Ce) citrate, the tissue/organ distribution and effects of Ce on selected behavioral parameters (ambutations and rearings in the open field, hole-in-board exploratory behavior, passive and active avoidance learning, and an aspect of social behavior) were investigated. Effects of Ce on the gravid and lactating female and on parameters of embryonic, fetal and postnatal development and behavior of offspring of Ce exposed dams also were studied.

PB81-150963 PC **A03**/MF **A01**
IIT Research Inst., Chicago, IL. Life Sciences Research Div.
Effect of Industrial Particulate Samples on Alveolar Macrophages,
Catherine Aranyi. Jan 81, 49p EPA-600/1-81-003
Grant EPA-R-805141

Toxic ranking of the <3 micrometer size fraction of particulate samples by in vitro rabbit alveolar macrophage assay showed generally low to intermediate cytotoxicity for samples obtained from a steel foundry, an electric arc furnace steel plant and from four coal-fired power plants. Particulates obtained from an aluminum and from a copper smelter were highly toxic to alveolar macrophages as monitored by viability, total cellular protein and ATP levels. The two smelter samples also contained soluble components that significantly contributed to their cytotoxicity. None of the particulate samples tested were true emission or effluent samples, but were collected from in-plant control devices. Inhalation of copper smelter particle aerosols produced significant changes in more of the parameters than inhalation of the coal fly ash. Thus, the overall objective of these studies was realized by demonstrating the validity of prediction of inhalation hazard on the basis of the in vitro screening assay.

PB81-150989 PC **A02**/MF **A01**
Slaska Akademia Medyczna, Katowice (Poland). Central Animal Farm.
Chronic Toxicity of Lead and Cadmium. II. Changes in the Central Nervous System of the F1 Generation of Rats after Chronic Intoxication with Lead and Cadmium.
Interim rept.,
Z. S. Herman, K. Kmieciak-Kolada, R. Szkilnik, R. Brus, and J. J. Jonek. Jan 81, 24p EPA-600/1-81-013
See also report dated Jan 80, PB81-110850.

This paper examines the effects of chronic exposure to the trace elements, lead and cadmium, on the central nervous system of F1 generation Wistar rats. Both the parental and F1 generation received treatments consisting of two levels of lead (5 or 50 ppm), two levels of cadmium (0.1 or 5 ppm), and two combined dosages (5 ppm lead and 0.1 ppm cadmium, or 50 ppm lead and 5 ppm cadmium). Treatments were administered in buffered drinking water. Behavioral changes, as measured by locomotor activity, were found to be both dose and age dependent. Changes in brain biogenic amino levels were also both dose and age dependent. In general, lead treatment caused decreases in blood aminolevulinic acid dehydrotase while cadmium caused increases in brain acetylcholinesterase and monamine oxidase. This study suggests that both behavior and biogenic amine level changes in discrete brain areas can occur as early as 30 days of age and these changes may be sensitive signs of chronic exposure to lead and/or cadmium.

PB81-152381 PC **A05**/MF **A01**
Massachusetts Univ., Amherst. Dept. of Public Health.
Effect of Chlorine Dioxide, Chlorite, and Nitrite on Mice with Low and High Levels of Glucose-6-Phosphate Dehydrogenase (G6PD) in their Erythrocytes.
Final rept. Oct 77-Oct 78,
Gary S. Moore, and Edward J. Calabrese. Feb 81, 93p EPA-600/1-81-014
Grant EPA-R-805557

Mice exposed to chlorine dioxide for 30 days at 100 ppm exhibited no significant differences from controls in any of the blood parameters measured. There were no additive or synergistic effects between chlorine dioxide and nitrite based on these same measurements. When A/J (high G6PD) and C57L/J (low G6PD) mice were exposed to various levels of sodium chlorite (0.0, 1.0, 10.0, and 100 ppm) for 30 days in their drinking water, there were a number of blood parameters that varied significantly with respect to treatment. However, with the exception of an increase in hemoglobin for the C57L/J strain at the 1.0 and 10.0 ppm level, all significant changes were associated with the 100 ppm exposure. There were no significant strain versus treatment interactions for any level of chlorite exposure.

PB81-152498 PC **A07**/MF **A01**
Akron Univ., OH.
Air Pollution and Health Effects in Children Residing in Akron, Ohio,
Richard A. Mostardi, Nancy R. Woebkenberg, Daniel Ely, Glenn Atwood, and Mary Conlon. Jan 81, 129p EPA-600/1-81-004
Grant EPA-R-804256

The purpose of this study was to determine the effects of ambient air pollutants on respiratory function, incidence, and severity of acute respiratory illness, nature of pulmonary epidemiology, and trace element accumulation, in 4th, 5th, and 6th grade children in Akron, Ohio. Air pollutants were measured at three locations and included sulfur dioxide (SO2), nitrogen dioxide (NO2), total suspended particulates (TSP) and from the Hi-Vol filters, suspended sulfates (SO4=) and suspended nitrates (NO3-). The filters and bubblers were run on a twenty-four hour daily schedule and chemical analyses were carried out by Community Health Assessment Monitoring Program (CHAMP) contractors. On the basis of available aerometric information it is concluded that SO2 in combination with NO2 is primarily responsible for the reduction in lung function tests and the exacerbations seen in the children at the Seiberling school.

PB81-152506 PC **A08**/MF **A01**
Loma Linda Univ., CA. School of Health.
Chromosome Aberrations in Peripheral Lymphocytes of College Students as a Response to Photochemical Air Pollution,
Allan R. Magie, David E. Abbey, and Willard R. Centerwall. Jan 81, 164p EPA-600/1-81-007
Grant EPA-R-804606-02

This research project was designed to confirm and extend to a more homogeneous group the observations of Scott and Burkart (9) in their study of chromosome aberrations in the peripheral lympho-

cytes of students attending the University of Southern California. The primary objective of this study was to compare whether the incidence of chromosome aberrations in peripheral lymphocytes of young adults emigrating from and immigrating to an area of low levels differed significantly from students indigenous to the respective area.

PB81-152589 PC **A02**/MF **A01**
Svejsecentralen, Glostrup (Denmark).
Summary of IIW Documents (1978-1979) from the Danish Welding Institute,
Richard M. Stern. c1980, 14p ISBN-87-87806-33-9, 80-49

The Working Environment Research Group of the Danish Welding Institute produces a number of articles each year reporting progress in a continuing project whose aim is the identification quantification and elimination of health risk in the working environment of welders. Each document is intended to be complete in itself, and is summarized in an abstract. It is useful however to describe some of the major contributions contained in those of the series which are introduced as IIW documents.

PB81-152597 PC **A02**/MF **A01**
Svejsecentralen, Glostrup (Denmark).
Assaying Potential Carcinogenicity of Welding Fume and Hexavalent Chromium with the Mammalian Spot Test,
Ib Knudsen, and Richard M. Stern. c1980, 24p ISBN-87-87806-37-1, 80-28

Particles from Manual Metal Arc welding of stainless steel (100 mg/kg) and potassium chromate (10/mg/kg) produce gray or brown spots in the fur of offspring from mice injected intraperitoneally with the test substance at days 8, 9, and 10 of pregnancy. The same results are obtained with a known mutagen, cyclophosphamide (2.5 mg/kg). The mammalian spot test is at present undergoing validation as an in vivo screening test for the mutagenic and hence by inference the carcinogenic potential of chemicals. The positive results for cyclophosphamide and potassium chromate are in agreement with previous in vitro experiments, and confirm the sensitivity of the test. The positive effect of welding fume particles in this in vivo system suggests a potential risk for humans directly exposed to this class of welding fume.

PB81-152605 PC **A03**/MF **A01**
Svejsecentralen, Glostrup (Denmark).
Criteria for Assessment of Potential Hazards to Welders Health,
Richard M. Stern. c1980, 37p ISBN-87-87806-21-5, 80-27

Although many potential health hazards can be found in the welding environment, it is impossible at present, with only few exceptions, to quantitatively determine either the individual or the collective risk which they represent or to identify in advance those welders whose health will suffer from the insults to which they are exposed.

PB81-153843 PC **A06**/MF **A01**
Syracuse Univ. Research Corp., NY.
Assessment of Mutagenic Potential of Mixtures of Organic Substances in Renovated Water.
Final rept. 1 Jan 77-16 Jun 80,
M. W. Neal, L. Mason, D. J. Schwartz, and J. Saxena. Feb 81, 112p EPA-600/1-81-016
Grant EPA-R-804813

An investigation was undertaken to evaluate the performance of several advanced wastewater treatment plants having biological, physical chemical, or soils treatment systems for removing or introducing mutagenic substances. Samples were taken before and after treatment and sometimes at intermediate points. Both concentrated and unconcentrated wastewaters were used. Three different concentration methods were utilized and compared. Salmonella typhimurium, Saccharomyces cerevisiae, and mammalian cells were used in the test systems. Mutagenic activity was found to pass through most treatment plants and sometimes increased during treatment. Wastewater with no industrial wastes and strictly of domestic origin did not contain mutagenic properties.

PB81-154478 PC **A99**/MF**$10.50**
Tracor JITCO, Inc., Rockville, MD.
Registry of Toxic Effects of Chemical Substances, 1979 Edition. Volume One and Volume Two.
Annual rept.,
Richard J. Lewis, Sr., and Rodger L. Tatken. Sep 80, 1640p DHHS/PUB/NIOSH-80-111
Contract PHS-NIOSH-210-78-0050
Supersedes PB80-225063.

The 1979 edition of the Registry of Toxic Effects of Chemical Substances, formerly known as the Toxic Substances List, is the eighth revision prepared in compliance with the requirements of Section 20(a)(6) of the Occupational Safety and Health Act of 1970 (Public Law 91-596). The original list was completed on June 28, 1971, and has been updated annually in book format. Beginning in October 1977, quarterly revisions have been provided in microfiche (see Appendix VII). This Registry contains 144,053 listings of chemical substances: 39,221 are names of different chemicals with their associated toxicity data and 105,832 are synonyms. This edition includes approximately 5,300 new chemical compounds that did not appear in the 1978 Registry.

PB81-802423 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Industrial Health Hazards Due to Atmospheric Factors. October, 1978-December, 1980 (Citations from the NTIS Data Base).
Rept. for Oct 78-Dec 80.
Jan 81, 164p
Supersedes PB80-802473, and NTIS/PS-78/1075. See also 1970-July, 1975, NTIS/PS-76/0912 and August, 1975-September, 1978, PB80-802465.

The bibliography contains abstracts of research reports covering such topics as industrial medicine, occupational diseases, health of miners, and the toxicological factors of various pollutants. Some pollutants included are manganese, radon, silicon dioxide, explosives, asbestos, platinum, palladium, polyvinyl chloride, nickel, pesticides, chromium, plastics and vanadium. (This updated bibliography contains 157 citations, 89 of which are new entries to the previous edition.)

PB81-935100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Chemical Carcinogenesis: Nitroso Compounds.
Cancergram CK01.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This agent-oriented Cancergram covers all information on nitroso compounds that might be relevant to research on the carcinogenicity of these compounds, or to judgments concerning the possible public hazards of these compounds or their precursors. Abstracts included concern induction of neoplasms by nitroso compounds; formation, biochemistry, cellular effects, and mutagenicity of nitroso compounds; reviews including nitroso compounds; and analytical methods for nitroso compounds. The Cancergram generally excludes all material on the properties of the nitrosourea compounds used in cancer therapy.

PB81-935600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Chemical Carcinogenesis: Polycyclic Aromatic Hydrocarbons, and Related Compounds.
Cancergram CK07.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The agent-oriented Cancergram deals with the carcinogenicity of polycyclic aromatic hydrocarbons and of certain related nitrogen-heterocyclic analogs having similar mechanisms of carcinogenesis and similar occurrences in the environment. The Cancergram covers carcinogenicity and modification of carcinogenicity, activation and metabolism, macromolecular binding, cellular effects and lesions, mutagenicity and in vitro testing, and analytical methods for the compounds and their derivatives. It also includes formation, occurrence in the environment, and various aspects of human exposure to these compounds. The Cancergram excludes studies where polycyclic aromatic hydrocarbons have been used simply as a tool to induce experimental tumors for other studies. Also excluded are heterocyclic hydrocarbons of nonenvironmental origin (such as drugs) or which act through a carcinogenic mechanism markedly different from that of the polycyclic aromatic hydrocarbons.

PB81-936400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Chemical Carcinogenesis: Miscellaneous Agents.
Cancergram CK13.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram deals with all aspects of experimental carcinogenesis induced by a variety of chemical agents which have not been specifically covered by other Cancergrams of this series. Included among these agents are hydrazines; heterocyclic compounds; asbestos, metals, and other inorganic substances; amides and related compounds; amino acid analogs; aliphatic and aromatic halogenated compounds; benzene derivatives; and miscellaneous commercial products. The Cancergram covers, in general, the induction of cancer, mechanisms of carcinogenesis, and morphological, physiological, biochemical, and toxicological effects of the agents that are relevant to their carcinogenic properties. Many of these agents are identified because of high exposure for humans; however, their relationship to human cancer is generally excluded from the scope of this Cancergram, as this subject is comprehensively covered in Cancergram CK02. Because they are the subject of other Cancergrams of this series, other topics excluded from this Cancergram are studies limited to the carcinogenicity of nitroso compounds (see CK01), polycyclic aromatic hydrocarbons (see CK07), and azo dyes and aryl amines (see CK10). This Cancergram also excludes studies of anticarcinogenic agents unless they relate to mutagenicity or carcinogenicity.

7. CHEMISTRY

7A. Chemical Engineering

DOE/ET/10325-T3 PC **A02**/MF **A01**
Air Products and Chemicals, Inc., Allentown, PA.
Cryogenic Methane Separation/Catalytic Hydrogasification Process Analysis. Quarterly Report.
J. Klosek. 2 Dec 80, 17p
Contract AC01-78ET10325

The objective of this extension of DOE contract No. DEAC01-78ET10325, Cryogenic Methane Separation/Catalytic Hydrogasification Process Analysis, is to perform trade-off and optimization studies for the Rockwell/Cities Service Short Residence Time Hydrogasification (SRTH) and the Exxon Catalytic Coal Gasification (CCG) processes in the acid gas removal and cryogenic separation areas. The contract extension is divided into nine (9) subtasks. Each subtask studies the effect of variation of a keV design parameter on the treatment cost of the SNG produced. All subtasks will be conducted under the Task I scope of the original DOE contract No. ET-78-C-01-3044, which in-

cludes block flow sheet, overall heat and material balance, utility summary, four-line equipment description, investment and treatment cost summaries and final report writing in addition to monthly and quarterly reports. Planning and progress by both companies is described briefly. (ERA citation 06:005650)

DOE/ET/12229-T1 PC **A05**/MF **A01**
Illinois Inst. of Tech., Chicago.
Solids Circulation around a Jet in a Fluidized Bed Gasifier. Final Technical Report, September 1, 1978-September 30, 1980.
D. Gidaspow, B. Ettehadieh, C. Lin, A. Goyal, and R. W. Lyczkowski. 1980, 79p
Contract FG21-78ET12229

The object of this investigation was to develop an experimentally verified hydrodynamic model to predict solids circulation around a jet in a fluidized bed gasifier. Hydrodynamic models of fluidization use the principles of conservation of mass, momentum and energy. To account for unequal velocities of solid and fluid phases, separate phase momentum balances are developed. Other fluid bed models used in the scale-up of gasifiers do not employ the principles of conservation of momentum. Therefore, these models cannot predict fluid and particle motion. In such models solids mixing is described by means of empirical transfer coefficients. A two dimensional unsteady state computer code was developed to give gas and solid velocities, void fractions and pressure in a fluid bed with a jet. The growth, propagation and collapse of bubbles was calculated. Time-averaged void fractions were calculated that showed an agreement with void fractions measured with a gamma ray densitometer. Calculated gas and solid velocities in the jet appeared to be reasonable. Pressure and void oscillations also appear to be reasonable. A simple analytical formula for the rate of solids circulation was developed from the equations of change. It agrees with Westinghouse fluidization data in a bed with a draft tube. One dimensional hydrodynamic models were applied to modeling of entrained-flow coal gasification reactors and compared with data. Further development of the hydrodynamic models should make the scale-up and simulation of fluidized bed reactors a reality. (ERA citation 06:005651)

DOE/ET/13400-T1 PC **A02**/MF **A01**
Columbia Gas System Service Corp., Columbus, OH.
Catalytic Enhancement of Coal Gasification Program.
22 Oct 79, 8p
Contract AC01-79ET13400

Because of numerous problems and equipment failures during startup, Run A-1 has not been completed as of the end of the report period. The most serious delays were caused by: (1) burnout of one of the boiler electrodes; (2) burnout of the main electrical gas heaters inside the reactor; (3) burnout of the electrical steam superheater; and (4) non-sealing of one of the two lockhopper valves. (ERA citation 06:005652)

EPRI-AP-1634 PC **A07**/MF **A01**
Pennsylvania State Univ., University Park.
Characterization of Mineral Matter in Coals and Coal Liquefaction Residues. Final Report.
P. L. Walker, Jr., W. Spackman, P. H. Given, A. Davis, and R. G. Jenkins. Nov 80, 149p

One of the major aims of this program is to characterize organic and mineral components of coals and coal liquefaction residual materials. Relationships are sought between composition and properties of these components and the behavior of specific coals during liquefaction processes. Results show that the residual materials are made up of various organic and inorganic components. The organic phase of these materials is comprised of unaltered or partly reacted coal macerals and carbonaceous slids formed by retrogressive reactions during processing. Inorganic components are coal minerals, pyrrhotite and, in the case of liquefaction and subbituminous Wyodak coal, calcium carbonate precipitates. The exact distribution of all these components is a function of feed coal, and processng conditions (H-Coal or Solvent Refining). Studies have been made into factors which influence retrogressive reactions during Solvent Refining. In the absence of a hydrogen donor, short contact times SRC's form semi-coke more readily than do equivalent long contact time SRC's. Experiments with SRC fractions show that the propensity to undergo retrogressive reactions is strongly influenced by phenolic oxygen functionality and molecular weight. Semi-coke formation is markedly inhibited by hydrogen transfer either by added hydrogen donors or compounds which can shuttle hydrogen. The techniques developed by this project have potential as a means of diagnosing problems or inefficiencies in plant or equipment operation. (ERA citation 06:005661)

FE-MIT-2295T26-10 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Critical Studies in the Rapid Pyrolysis and Hydropyrolysis of Coal. Project Report, July 1, 1979-March 31, 1980.
J. B. Howard, T. W. Bush, F. Cariello, E. Ciesielczyk, and H. Franklin. Jun 80, 63p
Contract AT01-76ET10693

The conclusion to be drawn from these data is that the product slate obtained from hydropyrolysis of coal at 1000 exp 0 C and a hydrogen pressure of only 1 atm is quite different from that produced by pyrolysis. Switching the main gas from helium to hydrogen results in many gas product shifts, including ethylene to ethane and CO sub 2 to CO. CO becomes a major gas product as methane yields are increased considerably. Comparison of the appearance of the two tar products also indicates major compositional differences. Hydropyrolysis tars were light in color and almost completely soluble in methylene chloride, while pyrolysis tars were very dark in color and only partially soluble. A definitive assessment of possible effects of particle size must await additional studies of particle agglomeration although striking indications of a major effect were not evident in these results. Pyrolysis and hydropyrolysis experiments were also run with demineralized coal and with various added minerals. (ERA citation 06:005669)

FE-2353-13 PC **A13**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ. Synthetic Fuels Engineering Div.
EDS Coal Liquefaction Process Development. Phase IIIA. Interim Report.
Jan 78, 294p
Contract EX-76-C-01-2353

This report is the first Interim Report for ERDA Contract No. E(49-18)-2353 for the EDS (Exxon Donor Solvent) Coal Liquefaction Process Development, Phase IIIA. Funding is shared by ERDA, the Electric Power Research Institute, and Exxon Research and Engineering Company. Highlights from the report are summarized. The Illinois base case of the EDS Commercial Study Design was a major engineering task involving ten man-years effort. The objectives of the study were to develop a set of investments and economics for evaluating the EDS process vis-a-vis other liquefaction processes and energy alternatives, and to provide a meaningful basis for evaluation of alternative process configurations and design improvements. The estimated total erected cost for an instant (3rd quarter 1975) plant producing 60,000 B/SD of liquids from 24,000 T/D of Illinois No. 6 coal in rural Illinois is 1000 M$. To reflect the early stage of technology development and the uncertainty of the early stage of technology development and the uncertainty of project definition, process and project contingencies totaling about 40% have been added to the investment, bringing the total erected cost to 1400 M$. The required initial selling price for coal liquids has been calculated to be 22.53 $/B (1975$) excluding contingency, but increases to 27.85 $/B when contingency is added. These prices are based on 100% equity financing, a 15% current-dollar DCF return, product revenues and operating costs assumed to escalate at 5%/year, and coal feed costing 16 $/ton. (ERA citation 06:005664)

FE-2645-07 PC **A03**/MF **A01**
UOP, Inc., Des Plaines, IL. Corporate Research Center.
Deasphalting, Deashing and Upgrading of Coal Liquids. Final Annual Report, October 1, 1979-March 31, 1980.
F. J. Riedl, and A. J. DeRosset. 1980, 37p
Contract AC22-78ET13403

UOP solvent deashing technology was used to reduce the ash content of two coal liquefaction products to less than 20 ppM. One feedstock was a solvated coal slurry prepared by a modified UOP liquefaction process. The second was SRC-I filter feed. The lowest deashing rejection with the SRC-I filter feed was 18.8 wt %. It is possible that this rejection may be lowered to 15 wt % or less either through solvent modification or solvent ratio adjustment. Both UOP and the SRC-I deashed oils were successfully hydrotreated in fixed bed operations. The SRC-I deashed oil yielded hydrotreated products containing 10.0 and 10.2 wt % hydrogen. The UOP deashed oils yielded products containing 10.2 and 10.7 wt % hydrogen. The latter were recycled as a coal liquefaction solvent. This modified UOP liquefaction process demonstrated a 57 wt % yield (MAF basis) of high quality syncrude from Illinois No. 6 coal. The hydrotreated UOP coal oils were used for fluid catalytic cracking studies. Because of their low hydrogen content, conversions and naphtha yields were lower than those obtained commercially from petroleum feedstocks. It is concluded that the best route for downstream processing of deashed coal oils is catalytic hydrocracking. (ERA citation 06:005667)

FE-2893-53 PC **A21**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
EDS Coal Liquefaction Process Development. Phase IV-V. Annual Technical Progress Report, July 1, 1979-June 30, 1980.
Oct 80, 491p
Contract AB01-77ET10069
U.S. Sales Only.

This is the third Annual Technical Progress Report for the US Department of Energy Cooperative Agreement No. DE-FC01-77ET10069 (formerly EF-77-A-01-2893) for Exxon Donor Solvent (EDS) Coal Liquefaction Process Development, Phase IV-V. This report covers the period of July 1, 1979 through June 30, 1980. Funding is shared by US Department of Energy, Exxon Company, USA (a division of Exxon Corporation), Electric Power Research Institute, Japan Coal Liquefaction Development Company, Phillips Petroleum Company, ARCO Coal Company, and Ruhrkohle AG. The agreement covers the period January 1, 1977 through December 31, 1982. The Laboratory Process Research and Development studies were conducted at various Exxon Research and Engineering Co. (ER and E) facilities: Research and Development Division at Baytown, Texas; Products Research Division at Linden, New Jersey; and the Exxon Research and Development studies were performed at the Synthetic Fuels Engineering and Exxon Engineering Technology Departments of ER and E at Florham Park, New Jersey. The information dealing with the Management, Detailed Engineering, and Procurement and Construction of the 250 T/D Exxon Coal Liquefaction Pilot Plant (ECLP) was generated at Exxon Company, USA, Houston, Texas, and Exxon Engineering, Project Management Department of ER and E, Florham Park, New Jersey. Highlights from this report are summarized. (ERA citation 06:005668)

ORAU-173 PC **A06**/MF **A01**
Oak Ridge Associated Universities, Inc., TN. Manpower Education, Research and Training Div.
Construction Labor Assessment for Solvent-Refined-Coal Project I at Phase Zero.
M. G. Finn, and J. Trice. Nov 80, 112p
Contract AC05-76OR00033

The US Department of Energy (DOE) plans the construction of a solvent-refined-coal demonstration facility (SRC I), capable of processing 6000 tons of coal per day into a clean-burning solid fuel. The SRC I plant, which will be a large and complex construction project costing over $1 billion, is to be built near Newman, Kentucky, situated on the Green River between Owensboro, Kentucky, and Evansville, Indiana. The general contractor has not yet been selected. However, the project has been estimated to require nearly 3500 workers at peak employment in June 1982. It is projected that construction will start in January 1981 and be completed in February 1984. Nearly 99 percent of all requirements for construction craft labor is projected to occur during a 25-month period from June 1981

to June 1983; about 68 percent is projected to occur during the 1982 calendar year. This construction labor market assessment report is directed toward establishing and analyzing data on construction labor requirements, labor availability, and craft training facilities for the geographical area surrounding the SRC I site. It is divided into two chapters: the first is an assessment of labor supply and demand, and the second is an assessment of education and training resources. This report analyzes potential skilled labor shortages and possible alternatives for alleviating those shortages, but it does not address the array of socioeconomic implications of reducing shortages by training, by attracting workers who move permanently to the job site, or by attracting workers who live temporarily near the site and return home periodically. (ERA citation 06:005671)

ORNL/TM-6952 PC **A11**/MF **A01**
Oak Ridge National Lab., TN.
Technical Support to the Solvent Refined Coal (SRC) Demonstration Projects: Assessment of Current Research and Development.
M. S. Edwards, B. R. Rodgers, C. H. Brown, P. K. Carlson, and W. R. Gambill. Dec 80, 247p
Contract W-7405-ENG-26

A program to demonstrate Solvent Refined Coal (SRC) technology has been initiated by the US Department of Energy (DOE) in partnership with two industrial groups. Project management responsibility has been assigned to the Oak Ridge Operations Office (ORO) of DOE. ORO requested that the Oak Ridge National Laboratory assess current research and development (R and D) activities and develop recommendations for those activities that might contribute to successful completion of the SRC demonstration plant projects. The objectives of this final report are to discuss in detail the problem areas in SRC; to discuss the current and planned R and D investigations relevant to the problems identified; and to suggest appropriate R and D activities in support of designs for the SRC demonstration plants. Four types of R and D activities are suggested: continuation of present and planned activities; coordination of activities and results, present and proposed; extension/redirection of activities not involving major equipment purchase or modifications; and new activities. Important examples of the first type of activity include continuation of fired heater, slurry rheology, and slurry mixing studies at Ft. Lewis. Among the second type of activity, coordination of data acquisition and interpretation is recommended in the areas of heat transfer, vapor/liquid equilibria, and physical properties. Principal examples of recommendations for extension/redirection include screening studies at laboratory scale on the use of carbonaceous precoat (e.g., anthracite) infiltration, and 15- to 30-day continuous tests of the Texaco gasifier at the Texaco Montebello facility (using SRC residues). (ERA citation 06:005673)

PAT-APPL-6-065 771 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Coal-Feeding Mechanism for a Fluidized Bed Combustion Chamber.
Patent Application,
R. L. Gall. Filed 13 Aug 79, 14p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A fuel-feeding mechanism for a fluidized bed combustor is described in which a perforated conveyor belt is utilized in place of the fixed grid normally disposed at the lower end of the fluidized bed combustion zone. The conveyor belt is fed with fuel, e.g. coal, at one end thereof so that the air passing through the perforations dislodges the coal from the belt and feeds the coal into the fluidized zone in a substantially uniform manner. (ERA citation 06:006415)

PATENT-4 217 192 Not available NTIS
Department of Energy, Washington, DC.
Decontamination of Metals Using Chemical Etching.
Patent,
R. E. Lerch, and J. A. Partridge. Filed 11 Jun 79, patented 12 Aug 80, 5p PAT-APPL-6-047 446
Supersedes PAT-APPL-6-047 446.

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention relates to chemical etching process for reclaiming contaminated equipment wherein a reduction-oxidation system is included in a solution of nitric acid to contact the metal to be decontaminated and effect reduction of the reduction-oxidation system, and includes disposing a pair of electrodes in the reduced solution to permit passage of an electrical current between said electrodes and effect oxidation of the reductionoxidation system to thereby regenerate the solution and provide decontaminated equipment that is essentially radioactive contamination-free. (ERA citation 06:006343)

PB81-147837 PC **A05**/MF **A01**
Rohm and Haas Co., Bristol, PA. Engineering Div.
Design and Specifications of a 500 Gallon Per Day Secondary Refrigerant Freeze Concentration Pilot Plant to Treat Aqueous-Organic Industrial Streams, Phase I.
Final rept.,
Randall W. Carter. Jun 80, 92p W81-01006, OWRT-C-80351-S(8566)(1)
Contract DI-14-34-0001-8566
Portions of this document are not fully legible. Color illustrations reproduced in black and white.

The complete design specifications for a freeze concentration treatment pilot plant proposed by Rohm and Haas are presented. Freeze concentration purification of waste water by 'freezing out' the fresh water as ice can be more economical than distillation, incineration, or biological treatment. Rohm and Hass chose to investigate the purification of a dilute aqueous stream containing 1.5% acetic acid, 0.5% formaldehyde, and 1.0% other organic acids. The pilot plant is a two-stage, secondary refrigerant, direct contact freezing process with indirect melting and is an energy integrated system. The acetic acid solution is frozen by sparged liquid butane vapor and since acetic acid and water form a simple eutectic, the water freezes out of the solution as pure ice. The ice is separated out and melted using the heat from the condensing butane. The pilot plant was designed to produce 500 gallons per day of fresh water from waste water containing 3% organic waste with a capacity to expand to 750 gallons per day of fresh water from a 50% acetic acid solution. The pilot plant length is 37 feet and the estimated cost of a trimmed pilot plant is $480,981. The materials balance, engineering drawings and instrument specifications, cost estimates, and construction of a scale model have been completed.

PB81-148157 PC **A03**/MF **A01**
Bureau of Mines, Reno, NV. Reno Research Center.
Producing Alumina from Clay by the Hydrochloric Acid Process, a Bench-Scale Study.
Rept. of investigations/1980,
J. A. Eisele. 1980, 28p BUMINES-RI-8476

The Bureau of Mines conducted bench-scale cyclic tests to determine the composition of recycled leach liquor in the bureau's proposed clay/HCl leach/HCl sparge process for producing Al2O3 from clay. The data developed from these tests make it possible to synthesize leach liquors for predetermined steady-state operating conditions when conducting large-scale crystallization tests.

7B. Inorganic Chemistry

N81-15035/1 PC **A07**/MF **A01**
San Jose State Univ., CA. Dept. of Chemistry.
Some Aspects of Analytical Chemistry as Applied to Water Quality Assurance Techniques for Reclaimed Water: The Potential Use of X-Ray Fluorescence Spectrometry for Automated on-Line Fast Real-Time Simultaneous Multi-Component Analysis of Inorganic Pollutants in Reclaimed Water.
Final rept., Jan. 1978 - Sep. 1980.
A. C. Ling, L. H. Macpherson, and M. Rey. 10 Jan 81, 135p NASA-CR-163847
Grant NSG-2305

The potential use of isotopically excited energy dispersive X-ray fluorescence (XRF) spectrometry for automated on line fast real time (5 to 15 minutes) simultaneous multicomponent (up to 20) trace (1 to 10 parts per billion) analysis of inorganic pollutants in reclaimed water was examined. Three anionic elements (chromium 6, arsenic and selenium) were studied. The inherent lack of sensitivity of XRF spectrometry for these elements mandates use of a preconcentration technique and various methods were examined, including: several direct and indirect evaporation methods; ion exchange membranes; selective and nonselective precipitation; and complexation processes. It is shown tha XRF spectrometry itself is well suited for automated on line quality assurance, and can provide a nondestructive (and thus sample storage and repeat analysis capabilities) and particularly convenient analytical method. Further, the use of an isotopically excited energy dispersive unit (50 mCi Cd-109 source) coupled with a suitable preconcentration process can provide sufficient sensitivity to achieve the current mandated minimum levels of detection without the need for high power X-ray generating tubes.

PB81-850224 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Deicing Techniques and Equipment. January, 1970-August, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Aug 80,
Sep 80, 240p NERACUSGNT1400
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the use of mechanical, chemical and other forms of deicing equipment. Applications in aircraft and automobiles as well as effects of road deicing salts are covered. (Contains 200 citations, fully indexed and including a table of contents.)

7C. Organic Chemistry

AD-A093 586/6 PC **A02**/MF **A01**
North Carolina Univ. at Chapel Hill. Dept. of Chemistry.
New Magnetic and Structural Results for Uniformly Spaced, Alternatingly Spaced, and Ladder-Like Copper(II) Linear Chain Compounds.
Interim technical rept.,
William E. Hatfield. 15 Dec 80, 13p Rept no. TR-15
Contract N00014-76-C-0816

Results of recent synthetic, structural, and magnetic work on exchange coupled copper (II) ions bridged by nonmagnetic ligands are discussed, including the quasi-linear chain compound bis(dimethyldithiocarbamato)copper(II) in which the copper(II) ions are antiferromagnetically exchange coupled. An unusual correlation exist in the structural and magnetic data for (Cu(dmtc)2) infinity and other known sulfur bridged copper compounds. Data are presented for the alternatingly spaced linear chain compounds di-mu-chlorobis-(4-methylpyridin e)copper (II), and a series of dionebis(thiosemicarbazato)copper(II) compounds. Exchange coupling constants and alternation parameters were obtained from expressions which were empirically generated from calculations on rings of ten S = 1/2 ions for kT (absolute value of J) approx = or > 0.5 and J < 0. Finally, New results for recently discovered spin ladder systems are presented. (Author)

AD-A093 897/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
Hexamethylsilirane. I. Preparation, Characterization and Thermal Decomposition.
Interim rept.,
Dietmar Seyferth, Dennis C. Annarell, Steven C. Vick, and Don P. Duncan. 14 Feb 80, 19p
AFOSR-TR-80-1368
Grant AFOSR-79-0007

Pub. in Jnl. of Organometallic Chemistry, v201 p179-195 1980.

No abstract available.

AD-A093 916/5 Not available NTIS
Alabama Univ., University. Dept. of Chemistry.
Synthesis and Polymerization of Methyl alpha-Fluoroacrylate,
Charles U. Pittman, Jr., Mitsuru Ueda, Kiyoshi Iri, and Yoshio Imai. 18 Jan 80, 7p ARO-16201.5-EL
Contract DAAG29-79-C-0128
Availability: Pub. in Macromolecules, v13 n5 p1031-1036 Sep-Oct 80 (No copies furnished by DTIC/NTIS).

No abstract available.

7D. Physical Chemistry

AD-A093 526/2 Not available NTIS
Kansas State Univ., Manhattan. Dept. of Chemistry.
Hypovalent Radicals. 4. Gas-Phase Studies of the Ion-Molecule Reactions of Cyclopentadienylidene Anion Radical in a Flowing Afterglow,
Richard N. McDonald, A. Kasem Chowdhury, and D. W. Setser. 26 Dec 79, 9p ARO-14511.2-C
Grants DAAG29-77-G-0142, NSF-CHE76-80382
See also AD-A092 648.
Availability: Pub. in Jnl. of the American Chemical Society, v102 n21 p6491-6498 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 527/0 Not available NTIS
Texas Univ. at Austin.
Thermal Decomposition of Ethylene,
T. Tanzawa, and W. C. Gardiner, Jr. 20 Nov 78, 13p ARO-15826.2-C
Grant DAAG29-78-G-0174
Availability: Pub. in Combustion and Flame, v39 p241-253 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 532/0 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Characterization by Tin-Specific Size Exclusion Chromatography of the Free Radical Copolymerization of Tributyltin Methacrylate and Methyl Methacrylate,
E. J. Parks, F. E. Brinckman, C. E. Mullin, D. M. Anderson, and V. J. Castelli. 11 Dec 80, 20p

Copolymers of tributyltin methacrylate (TBTM) and methyl methacrylate (MMA) comprise an important class of biocidal slow-release organotin polymers (OMP's). Little is known of the kinetics and mechanism of copolymerization. TBTM and MMA were copolymerized in the presence of a free radical initiator (benzoyl peroxide) at 80.1 deg. C. Aliquots, taken at preselected intervals from 0 to 1440 min, were fractionated by size exclusion chromatography (SEC) coupled with ultraviolet (UV) and tin-specific graphite furnace atomic absorption (GFAA detectors, A UV absorbance observed at 254 nm was associated with low molecular weight (MW) species, decreasing in concentration continuously with time of reaction. Tin-specific GFAA indicated a decrease in low MW species (c. 350 daltons) with concurrent increases in high MW species (c. 40,000 daltons). The fraction of high MW increased as a linear function of the logarithm of the time of reaction. SEC-UV-GFAA thus provides a tool of major importance for characterizing the time dependence and continuity of the process by which monomers of TBTM are converted to a useful bioactive slow-release coating material. (Author)

AD-A093 578/3 Not available NTIS
New York Univ., NY. Dept. of Physics.
Coherence Effects in Radiatively Assisted Inelastic Collisions: General Theory,
Paul R. Berman. 21 Mar 80, 10p
Contract N00014-77-C-0553
Availability: Pub. in Physical Review A, v22 n5 p1838-1847 Nov 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 587/4 PC **A03**/MF **A01**
North Carolina Univ. at Chapel Hill. Dept. of Chemistry.
Exchange Coupling in the Alternating Chain Compounds Catena-Di-micron-chlorobis(4-Methylpyridine)Copper(II), Catena-Di-micron-bromobis-(N-Methylimidazole)Copper(II), Catena-hexanedionebis(Thiosemicarbazato)Copper(II), and Catena-octanedionebis(thiosemicarbazato)Copper(II).
Interim technical rept.,
James W. Hall, Wayne E. Marsh, Robert R. Weller, and William E. Hatfield. 15 Dec 80, 30p Rept no. TR-13
Contract N00014-76-C-0816

Magnetic susceptibility data have been collected for catena-octanedionebis-(thiosemicarbazonato)copper(II), Cu-OTS, and catena-hexane-dionebis(thiosemicarbazonato(copper(II), Cu-HTS, in the temperature range 1.8-120 K, and the data analyzed in terms of an alternating chain Heisenberg exchange model to yield J = -10.1 + or - 0.2/cm, alpha = 0.91 + 0r - 0.02, and g = 2.06 + or - 0.02 for Cu-HTS and J = 12.9 + or - 0.2 alpha = 0.90 + or - 0.02, and g = 2.11 + or - 0.02 for Cu-OTS. Anomalies in the temperature dependent capacitance data for catena-di-micron-chlorobis(4-methylpyridine)copper(II) and catena-di-micron-bromo(N-methylimidazole)copper(II) provide evidence for structural phase transitions presumably from uniform chain structures at room temperature to alternating chain structures at low temperatures. Magnetic parameters for Cu(4-methylpyridine)2Cl2 are J = -9.6 + or - 0.2/cm, g = 2.17 + or - 0.02 and alpha = 0.67 + or - 0.02. An expression for the magnetic susceptibility of a Heisenberg alternating chains of S = 1/2 ions has been developed in terms of the alternation parameter, the exchange coupling constant, and the g factor. (Author)

AD-A093 650/0 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Photocatalytic Water Decomposition and Water-Gas Shift Reactions over NaOH-Coated, Platinized TiO2.
Technical rept. no. 19, 1 Jan-31 Dec 80,
Shinri Sato, and J. M. White. 9 Dec 80, 15p
Contract N00014-75-C-0922

The photocatalytic decomposition of gaseous water takes place over platinized TiO2 coated with NaOH (more than 7 wt. %). The quantum efficiency of H2 and O2 production reaches about 7% (20 micromole H2/hr) at the beginning of the reaction but declines with accumulation of the products due to the thermal back reaction over Pt. The effect of the back reaction can be reduced by increasing the NaOH loading. (Author)

AD-A093 692/2 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemistry.
Luminescent Photoelectrochemical Cells. 5. Multiple Emission from Tellurium-Doped Cadmium Sulfide Photoelectrodes and Implications Regarding Excited-State Communication.
Technical rept.,
Bradley R. Karas, Holger H. Streckert, Rodney Schreiner, and Arthur B. Ellis. 3 Dec 80, 26p Rept no. TR-6
Contract N00014-78-C-0633
See also AD-A093 695.

Samples of single-crystal, n-type, 100 ppm Te-doped CdS (CdS:Te) exhibit two emission bands when excited at several ultraband gap wavelengths. One emission band with lambda sub max approximates 510 nm is near the band gap of CdS:Te (approximates 2.4 eV) and is likely edge emission. Its decay time, measured for samples immersed in sulfide solution between 295 and 333 K, is faster than the pulse from the N2-pumped dye laser (approximates 7 nsec) used for 458-nm excitation. The other emissive transition, lambda sub max approximates 600 nm, involves intraband gap states introduced by Te. Intensity-time curves for this band have rise times of less than 10 nsec and generally exhibit nonexponential decay; values of tau sub 1/e are typically 120 + or - 40 and 80 + or - 30 nsec at 295 and 333 K, respectively. When CdS:Te is used as the photoanode in a photoelectrochemical cell employing sulfide electrolyte, both emission bands are quenched in parallel during passage of photocurrent resulting from 457.9- or 476.5-nm Ar ion laser excitation. Parallel quenching is observed at several temperatures for which the excited-state kinetic schemes are demonstrably different: open-circuit emission spectra reveal that both the absolute and relative intensities of the two emission bands are affected by temperature. With increasing temperature (295-333 K) the absolute intensities of both bands decline; a semilog plot of the ratio of 510- to 600-nm intensity vs. T to the -1 is linear with a slope of approximates 0.2 eV, corresponding to the energy gap between the two excited states. The existence of excited-state communication is inferred from the effects of temperature and electrode potential on multiple emission.

AD-A093 693/0 PC **A02**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Physics.
Motional Correlation Time of Dilute 111Cd Impurities in Liquid S and Se.
Interim rept.,
D. K. Gaskill, J. A. Gardner, K. S. Krane, K. Krush, and R. L. Rasera. 10 Dec 80, 10p Rept no. TR-1
Contract N00014-79-C-0668
Prepared in cooperation with Maryland Univ. Baltimore County, Catonsville.

The elements sulfur, selenium and tellurium have been extensively studied in the liquid state on account of their interesting electrical and physical properties. According to current understanding, these materials exist in the liquid in the form of chain- or ring-shaped molecules, depending on the material and temperature range. Their electrical properties are strongly influenced by bonding irregularities in the predominant structure, such as chain ends, branches or impurities. As temperature increases, the relative concentration of these effects in bonding also increases, with a concomitant increase in the conductivity. Physically, the viscosity of the liquids decreases rapidly with increasing temperature, suggesting that the liquids undergo marked structural changes (ring-chain transformation, and shortening of chain length with increasing temperature, for example). Although powerful tools such as NMR, neutron scattering, and viscosity measurements, among many others, have been used to study these materials, a complete understanding of the dynamical behavior of these liquids is still lacking. We describe here an application of time-differential perturbed angular correlation (TDPAC) to the study of molecular dynamics in liquid S and Se.

AD-A093 694/8 PC **A02**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Physics.
Motional Correlation Time of Dilute 111Cd Impurities in Se-Rich Liquid Se-Te Alloys.
Interim rept.,
D. K. Gaskill, J. A. Gardner, K. S. Krane, K. Krusch, and R. L. Rasera. 10 Dec 80, 7p Rept no. TR-2
Contract N00014-79-C-0668
Prepared in cooperation with Maryland Univ. Baltimore County, Catonsville.

No abstract available.

AD-A093 695/5 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemistry.
Luminescent Photoelectrochemical Cells. 4. Electroluminescent Properties of Undoped and Tellurium-Doped Cadmium Sulfide Electrodes.
Technical rept.,
Holger H. Streckert, Bradley R. Karas, David J. Morano, and Arthur B. Ellis. 3 Dec 80, 27p Rept no. TR-5
Contract N00014-78-C-0633
See also AD-A093 692.

An understanding of electrochemistry at semiconductor electrodes requires knowledge of the role intraband gap states play in mediating interfacial charge transfer. Reference to surface states is especially prevalent in the photoelectrochemical cell

(PEC) literature. The existence of intraband gap states has been supported in part by electroluminescence (EL) studies: Electrolyte species capable of hole injection into the valence bands of n-type, semiconducting TiO2, SrTiO3, CdS, GaP, ZnO, and GaAs yielded luminescence at sub-band gap energies. Since the valence band edges of these materials are generally at very positive potentials, valence band hole injection requires a potent oxidizing species. Aqueous alkaline peroxydisulfate (OH(-)/S2O8(2-)) electrolyte has been the medium of choice for observing the effect.

AD-A093 704/5 PC A02/MF A01
Yale Univ., New Haven, CT. Dept. of Engineering and Applied Science.
Raman Capabilities for Aerosol Characterization.
Final rept. 1 Oct 78-30 Sep 80,
Richard K. Chang. Nov 80, 12p ARO-15030.6-GS
Grant DAAG29-79-G-0008

Chemical speciation of microparticles can be achieved by spectral and intensity analyses of the inelastically scattered radiation (Raman and fluorescence). However, quantitative results by purely optical methods are intimately related to the environment with which the particles are in contact and the morphology of the microstructures. Morphology characterization of regularly shaped microparticles (spheres, cylinders, and spheroids) can be obtained by measuring the peaks in the extinction and elastically scattering spectra. Our investigation on the viability of quantitative species identification of molecules within a microparticle by inelastic laser scattering involved studies of the following: (1) dielectric and metal substrate interface to increase the intensity of the scattered radiation; and (2) morphology dependent dielectric resonances which can modify the scattering spectra.

AD-A093 726/8 PC A02/MF A01
New York Univ., NY. Dept. of Chemistry.
Photoelectron Emission Spectroscopy of Inorganic Cations in Aqueous Solution.
Technical rept.,
Paul Delahay, Kathrin von Burg, and Andrew Dziedzic. Dec 80, 22p Rept no. TR-13
Contract N00014-75-C-0397

Threshold energies (6.1 less than E sub t equal to or lesser than 8.6 eV) are determined for photoelectron emission by 16 inorganic cations in aqueous solution. E sub t's are correlated with gas-phase ionization potentials, solvation and reorganization free energies, standard reduction potentials and ligand field stabilization energies (five transition metals). Dielectric saturation is shown to drastically lower threshold energies. (Author)

AD-A093 730/0 PC A03/MF A01
California Inst. of Tech., Pasadena.
Mass Spectrometric Investigations of Organophosphorus Compounds.
Final technical rept.
J.L. Beauchamp. 19 Dec 80, 45p ARO-14181.1-CX
Grant DAAG29-76-G-0274

The techniques of ion cyclotron resonance spectroscopy are employed to investigate the acid-base properties and ion-molecule reactions of organophosphorus compounds in the gas phase. The chemistry of reagent species useful in positive and negative ion chemical ionization mass spectrometry is characterized in conjunction with their use in schemes to selectively ionize and detect organophosphorus compounds. (Author)

AD-A093 731/8 PC A02/MF A01
Pittsburgh Univ., PA. Dept. of Chemistry.
Chemical Reactions, Radiative and Energy Transfer Processes of Important Atmospheric Species.
Final Rept. 1 Jan-31 Oct 80,
Frederick Kaufman. 23 Dec 80, 5p ARO-17166.2-C
Contract DAAG29-80-C-0058

During the ten-month period of this grant, results of accurate measurements of the reaction rate of N(2D) and N(2P) with O2 were published. Further measurements of the laser-excited fluorescence spectrum of NO2 and of its temperature dependence were also published as were the collisional quenching rates and their temperature dependence. (Author)

AD-A093 754/0 PC A08/MF A01
RAND Corp., Santa Monica, CA.
AB Initio Configuration Interaction Calculations on the States of HF(-),
Kathleen A. Wolf. Sep 80, 175p Rept no. RAND/P-6535

The principles that form the basis of all quantum mechanics were first introduced in 1926 by Schroedinger. Since that time these principles have been extended to become the framework of the theory used today. Although the simplicity of the theory cannot be questioned, practical implementation of the basic concepts has often proven difficult. For certain applications, including the hydrogen atom as well as other one electron systems, the Schroedinger Theory allows exact analytic solution. For larger systems, approximations are necessary. The first approximation that is generally incorporated into the Schroedinger Theory is known as the Born Oppenheimer Approximation. The use of this approximation allows the separation of electronic and nuclear motions. Further simplification can be achieved through a method for dealing with the electron-electron interaction potential. This approach was first suggested by Hartree, and was subsequently extended by Fock to include exchange effects. In molecular orbital theory, an electron orbital is replaced by a one-electron wave function delocalized over the whole molecule. This concept, together with the Pauli principle and the work of Hartree and Fock allow the wavefunction to be expressed in a single Slater determinant.

AD-A093 759/9 PC A02/MF A01
Aerospace Corp., El Segundo, CA. Lab. Operations.
Isotopic Determination of Lead by Secondary Ion Mass Spectrometry.
Interim rept.,
Patricia A. Bertrand, Reinhold Bauer, and Paul D. Fleischauer. 15 Dec 80, 20p TR-0081(6403-02)-1, SD-TR-80-59
Contract F04701-80-C-0081

A method is described by which samples containing as little as 5 ng of lead can be isotopically analyzed. The procedure was developed for use with lubricating oils containing additives labeled with particular lead isotopes, but it can also be applied to the determination of lead in other materials. It consists of three steps: (1) digestion of the organic sample to release the lead into aqueous solution, (2) anodic deposition of the lead onto platinum electrodes, and (3) secondary ion mass spectrometry. Quantitative determination of the amount of lead in a sample can be accomplished by adding to the sample a known amount of a standard lead compound with an isotopic composition different from the sample. (Author)

AD-A093 783/9 PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Mechanisms and Processes for Conversion of Smaller Boranes to Larger Boranes or Borane Fragments.
Final rept. 15 Dec 75-30 Sep 80,
Robert W. Parry, and Goji Kodama. 1 Oct 80, 21p ARO-13451.6-CX, ARO-16243.5-CX
Grant DAAG29-76-G-0120

Successful isolation and characterization of Me3NB4H8 revealed an aspect of the base catalysis of borane condensation, and triggered the discovery of new hypho class compounds B4H8(2PMe3) and B3H5(3PMe3). Formation of a new class (klado) of compound B4H6(4PMe3) was confirmed also. These higher class compounds are promising reagents for borane expansion. A triborane cation, (B3H6(PMe3)2)+, was prepared from B2H4(2PMe3). The diborane(4) adduct can be used as a reagent for borane expansion. An attempted conversion of B5H9 to B10H14 is described. (Author)

AD-A093 790/4 PC A05/MF A01
Temple Univ., Philadelphia, PA. Dept. of Chemistry.
Cooperative Interactions in Liquid Crystal Mixtures
Final rept. 1 Oct 77-31 Oct 80,
M.M. Labes. Oct 80, 87p ARO-15035.2-C
Grant DAAG29-78-G-0001

The first objective of this program was to study fluorescent guest-host interactions in liquid crystals and electrooptic effects based on these interactions. Utilizing europium chelates and oligophenylenes cholesteric liquid crystal hosts, strong emission could be observed in the visible (caused by UV excitation), which could be effectively reduced by electrically switching the cholesteric texture to a homeotropic nematic texture. A simple model to account for the observed behavior was developed. Such a cholesteric electrooptic cell can also be used as a UV shutter, and by interfacing with an external passive fluorescent element, two-color displays can be achieved. Multicolor displays can be made by stacking shutter cells and passive elements. Dynamic scattering cells can be used to achieve such effects, but the contrast ratios are not high. A nematic homogeneous-homeotropic electrooptic effect can also be used as both a single color or two-color fluorescent display. (Author)

AD-A093 804/3 PC A03/MF A01
Minnesota Univ., Minneapolis. Dept. of Chemistry.
Site Symmetry of Surface Adsorbed Molecules.
Technical rept.,
Henry Nichols, and Robert M. Hexter. 15 Dec 80, 46p Rept no. TR-6
Contract N00014-77-C-0209

A procedure for determining the allowed local site symmetry groups, S, for surface adsorbed molecules is presented. An analogy can be drawn between the perturbing field experienced by a matrix isolated molecule in a three-dimensional crystal and that experienced by a molecule adsorbed on a surface. In the former case, the field has the symmetry of the host lattice site whereas in the latter case, the field has the symmetry of the adsite. The symmetry operations of the local site symmetry group, S, consist of an operation in the molecular point group, M, applied to the molecule combined with an operation in G applied to the substrate. A mapping of the operations in M and G operations in their isomorphous Longuet-Higgins groups allows the operations to be identified as permutation, P, or permutation-inversion, P*, operations. The operations in M with P operations in G and of P* operations in G. An adsorbed molecule having M = D sub 3h symmetry is used as an example to demonstrate the procedure for determining S. The local site symmetry group of the adsorbed molecule is, in general, different for the homogeneous surface approximation as opposed to the microscopic surface approximation. An attempt is made to apply predicted spectroscopic selection rules to adsorbed pyridine and ethylene. Several factors which complicate the interpretation of Raman spectra of molecules adsorbed on metal surfaces are discussed, one of these being depolarization effects due to rough surfaces.

AD-A093 805/0 PC A03/MF A01
California Univ., Los Angeles.
Triboluminescence.
Final rept. 10 Aug 77-30 Sep 80,
William C. Kaska, and Jeffrey I. Zink. Dec 80, 28p ARO-14971.6-C
Grant DAAG29-77-G-0195

Triboluminescence is the emission of light caused by the application of mechanical energy to solids. Although the phenomenon has been known since the 17th century, neither the excited state origins of the luminescence nor the mechanism by which it is excited were understood until recently. Our efforts have focussed on the fundamental requirements for triboluminescence. We have uncovered and studied the fracture requirement, the pressure requirement, and the structure requirement for triboluminescence activity. We have also derived a quantitative theory for the dynamics of triboluminescence based on the dynamics of the creation and interaction of mobile fractures in a crystal. In addition to explaining the time dependence of the luminescence, the theory treats the effects of size ad impact velocity on the luminescence intensity. The instrument--which was designed to

measure these effects--also enabled us to quantitively compare the relative intensities of various crystals. We have continued to study triboluminescence spectroscopy. High pressure spectroscopy has played an important role in investigating the pressure requirements for triboluminescence. Finally, the synthesis and chemistry of triboluminescent materials, which have continued to be a cornerstone in the above investigations, led to the discovery of the polymorphic hexaphenylcarbodiphosphorane crystals and to other interesting materials which are described.

AD-A093 806/8 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Studies of the GaAs/Oxide Interface Using A Liquid Electrode.
Final rept. 28 Sep 77-27 Sep 80,
S. Roy Morrison, Karl W. Frese, Jr., and M. J. Madou. Nov 80, 6p ARO-15329.4-EL
Contract DAAG29-77-C-0049

Anodically grown oxides on GaAs were produced and their electrical properties measured by electrochemical techniques. It was concluded that residual unoxidized arsenic dissolved in the oxide causes poor insulating characteristics, and methods to correct the problem were examined. (Author)

AD-A093 845/6 PC **A03**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Semiconductor Electrodes. XXXIII. Photoelectrochemistry of n-Type WSe2 in Acetonitrile.
Technical rept. no. 12, 1 Sep 80-31 Aug 81,
Henry S. White, Fu-Ren F. Fan, and Allen J. Bard. 6 Jan 81, 34p
Contract N00014-78-C-0592
See also report dated 2 Jan 80, AD-A088 507.

The photoelectrochemical behavior of n-type WSe2 single crystal electrodes in acetonitrile solutions containing several redox couples was investigated. Electrodes with discontinuities in the van der Waals' surface show large dark currents and recombination of electrons with photooxidized solution species. Pretreatment of such a surface with Cl(-) passivates these dark active sites and increases the photocurrent density. The observed photopotentials at WSe2 for redox couples with potentials, V sub redox, more positive than 0.5 V vs SCE show behavior consistent with Fermi level pinning; the onset potential of photocurrents increases linearly with increasing V sub redox while the photopotential remains constant. The energy position at which pinning occurs depends on the density of surface states and the concentration of solution species.

AD-A093 852/2 PC **A02**/MF **A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Electron Microscope Study of Annealed SiH2 Implanted InP,
J. J. Comer, D. Eirug Davies, and J. P. Lorenzo. 11 Dec 79, 8p Rept no. RADC/ETR-80-0034
Pub. in Jnl. Of Electrochemical Society, v127 n8 p1827-1832 Aug 80.

No abstract available.

AD-A093 871/2 PC **A03**/MF **A01**
State Univ. of New York at Buffalo. Dept. of Chemistry.
Electrochemistry and Electrochemical Methodology in Molten Salts.
Robert A. Osteryoung, and Janet G. Osteryoung. Sep 80, 29p AFOSR-TR-80-1371
Contract F49620-79-C-0142

This work involved chemical and electrochemical studies in a room temperature molten salt, N-butylpyridinium chloride (BuPyC1); aluminum chloride together with efforts to devise and develop better electrochemical methods for the studies of reactions in these solvents. The reduction of the butylpyridinium cation, which is reduced prior to A1 in a basic (excess BuPyC1) melt was studied It was shown that coupling takes place to lead to the formation of viologen species. The deposition of A1 from this melt and the melt mixed with benzene as a cosolvent was studied; it was found that the acid-base properties of the solvent are unchanged when diluted with benzene.

AD-A093 873/8 PC **A03**/MF **A01**
Arizona Research Labs., Tucson.
Theory of Nonlinear Generation of X-Radiation in a Crystal Subjected to Intense Electron Bombardment.
Final rept. 1 Oct 79-30 Sep 80,
Marlan O. Scully, J. K. McIver, and G. T. Moore. Nov 80, 31p AFOSR-TR-80-1346
Grant AFOSR-80-0035

Several aspects of the generation of x-rays in a crystal were investigated in order to explain some of the experimental results observed by Das Gupta. Sequential excitation of planes of two-level atoms in a crystal was shown to produce stimulated line radiation whose intensity varied exponentially with the incident electron beam current. This result agreed qualitatively with the experimental data. Swept excitation was also used to explain the increase in the amount of line radiation produced at a given electron beam current when the electron's energy was changed from 8.95 KeV to 16.997 KeV. The difference between the lifetime of an excited two-level atom in free space and the lifetime of the same atom in a lattice of nonresonant two-level atoms was also investigated. The resulting difference was attributed to Bragg scattering of the emitted radiation in the crystal and the bulk properties of the materiel. (Author)

AD-A093 881/1 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
The Interaction of Monatomic and Diatomic Molecules with Solid Surfaces: The Structure of Water Cluster Beams and Their Scattering from Surfaces.
Final rept. 1 Oct 78-30 Sep 80,
David D. Dreyfuss, Leon Trilling, and Harold Y. Wachman. Nov 80, 182p AFOSR-TR-80-1365
Contract F44620-76-C-0036

An experimental study of homogeneous and heterogeneous nucleation was conducted, using molecular beam techniques: mass spectrometry and time-of-flight velocity spectrometry, with and without mass filtering. Both the clustered beam itself and the scattering of the clusters from surfaces were studied. The beam was found to consist of a broad spectrum of clusters all having approximately the same velocity distribution. Small clusters were found to have a binding energy much less than that of bulk ice. Measurements of a beam scattered from a surface using a time-of-flight velocity spectrometer show four distinct patterns. These are: (1) a diffuse scattering channel (monomers, Maxwellian/cosine at the target temperature), (2) a direct inelastic channel for monomers characterized by a small loss of incident velocity with a broad spatial distribution peaked at the tangent for all incident angles, theta sub i, (3) a well-defined specular directed lobe (theta sub s = theta sub i greater than 50 deg) with particle velocity much slower than (1) or (2) and a velocity distribution narrower than a stationary Maxwellian, and (4) another slow peak with a slightly broader velocity distribution into a sharp intensity peak near the tangent for all theta sub i greater than 50 deg. The amplitude of the specularly directed slow peak (3) appears to give a sensitive indication of surface coverage. (Author)

AD-A093 892/8 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemistry.
Organosilyl Substituted Phosphoranyl Radicals,
Thomas H. Newman, and Robert West. 28 May 80, 6p AFOSR-TR-80-1269
Grant AFOSR-78-3570
Pub. in Jnl. of Organometallic Chemistry, v199 pC39-C43 1980.

No abstract available.

AD-A093 893/6 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Chemistry.
Mass Spectrometry of Aryl Substituted Di- and Trisiloxanes,
Robert E. Swaim, William P. Weber, Heinz G. Boettger, Margaret Evans, and Frank M. Bockhoff. 10 Sep 79, 10p AFOSR-TR-80-1274
Grant AFOSR-77-3123
Pub. in Organic Mass Spectrometry, v15 n6 p304-311 1980.

No abstract available.

AD-A093 898/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
Hexamethylsilirane; Ring Cleavage by Germanium and Tin Hydrides,
Dietmar Seyferth, Jean Escudie, Mark L. Shannon, and Jacques Satge. 27 Jun 80, 5p
AFOSR-TR-80-1369
Grant AFOSR-79-0007
Pub. in Jnl. of Organometallic Chemistry, v198 pC51-C54 1980.

No abstract available.

AD-A093 900/9 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Sigma-Conjugation and Sigma-Aromaticity,
Michael J. S. Dewar. 27 Dec 79, 13p AFOSR-TR-80-1273
Grant AFOSR-79-0008
Pub. in Bulletin des Societes Chimiques Belges, v88 n12 p957-967 1979.

No abstract available.

AD-A093 905/8 PC **A02**/MF **A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Multielectron Effects in Photoemission from Quasi-Atomic Copper in Cu-Phthalocyanine,
M. Iwan, E. E. Koch, T. C. Chiang, D. E. Eastman, and F. J. Himpsel. 25 Oct 79, 5p
AFOSR-TR-80-1352
Contract F44620-76-C-0041
Pub. in Solid State Communications, v34 p57-60 1980.

No abstract available.

AD-A093 912/4 Not available NTIS
Duke Univ., Durham, NC. Dept. of Electrical Engineering.
Liquid Crystal Reflection Cell with Improved Response Times,
Herbert Hacker, I. Lefkowitz, and R. Lontz. 23 Jun 80, 5p ARO-15209.3-P
Grants DAAG29-77-G-0150, DAAG29-79-D-1001
Availability: Pub. in Applied Optics, v19 n19 p3257-3259, 1 Oct 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 930/6 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
An Investigation of the Techniques of Ellipsometry, Internal Reflection Spectroscopy, and Moment Analysis to the Study of Films and Substrates.
Final rept. 1 Oct 79-1 Sep 80,
Kent F. Palmer, and Michael Z. Williams. Jan 81, 72p Rept no. AEDC-TR-80-51
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Ellipsometry and internal reflection spectroscopy (IRS) are two methods of spectroscopic measurement which have some unique advantages over other reflection techniques for the study of films and substrates. Applications of these methods are fully discussed for work in the infrared and visible spectral regions. Moment analysis of spectral band shapes has been shown theoretically to yield information on the nature of the intermolecular interactions in condensed phases. These data are vital if concentrations of molecular species are to be found in a film. The experimental difficulties of moment analysis are discussed along with some preliminary results using existing AEDC data. Areas for future research are suggested for the spectroscopic analysis of films. (Author)

AD-A093 944/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Observation of Unidirectional Amplified Spontaneous Emission Induced by Velocity-Dependent Light Shifts,
G. Petite, B. C. Johnson, W. K. H. Lange, and M. M. Salour. 8 Aug 80, 5p
Contract N00014-79-C-0694
Pub. in Physical Review Letters, v45 n15 p1242-1245, 13 Oct 80.

No abstract available.

AD-A093 950/4 PC **A08**/MF **A01**
Northestern Univ., Evanston, IL. Dept. of Mechanical and Nuclear Engineering.
Investigation of Metal and Metal Oxide Clusters Small Enough to Constitute the Critical Size for Gas Phase Nucleation in Combustion Processes.
Final rept. 1 Oct 75-30 Jun 79,
Gilbert D. Stein. Nov 80, 153p Rept no. TR-17
Contract N00014-76-C-0378

Over the course of this contract a variety of techniques have been employed to study the properties of small atomic and molecular clusters formed in the gas phase via homogeneous nucleation. The clustering occurs either in an adiabatic expansion of a condensable species (e.g. argon, krypton, xenon, or sulfur hexafluoride) in an inert carrier gas (e.g. helium), or as a mixing process using a hot condensable (e.g. lead, silver, copper, indium or bismuth) and a cold carrier gas (e.g. argon, helium, carbon dioxide or sulfur hexafluoride). A continuous development several types of cluster sources has been carried out and includes free jets, very small hypersonic laval nozzles, and a series of metal ovens with carrier gas mixing. Any one, of these sources, constitutes the first stage of a differentially pumped, molecular beam system which the produces a continuous beam of clusters. The denisty in the beam is so low that it is collisionless and thus the clusters do not interact with each other or with any other foreign molecule or surface. The study of these isolated clusters is carried out primarily using high energy electron beams (40 to 75 KeV). The resulting diffraction patterns are obtained either on film or through use of a single channel, scintillation, pulse counting system employing synchronous detection.

AD-A093 972/8 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
Photochemistry of Metal-Metal Bonded Transition Element Complexes.
Interim technical rept.,
Mark S. Wrighton, James L. Graff, John C. Luong, Carol L. Reichel, and John L. Robbins. 12 Dec 80, 35p Rept no. TR-25-ONR
Contract N00014-75-C-0880

Transition metal complexes that have direct metal-metal bonds have been the objects of intense interest from the point of view of geometric and electronic structure, synthesis and catalysis. Low-lying electronic excited states of metal-metal bonded complexes often involve significant changes in the electron density associated with the metal-metal bond, compared to the ground electronic state. Accordingly, study of the photochemistry of metal-metal bonded complexes not only provides potential new reaction chemistry but also provides insight into, and confirmation of, the electronic structure. This symposium volume affords us an opportunity to record the state of the field of metal-metal bond photochemistry. The aim of this article is to summarize recent research results from this laboratory and to place them in perspective in relation to results from other laboratories. (Author)

AD-A093 976/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
Photogeneration of Very Active Homogeneous Catalysts Using Laser Light Excitation of Iron Carbonyl Precursors.
Technical rept.,
James C. Mitchener, and Mark S. Wrighton. 29 Dec 80, 21p ONR-TR-24
Contract N00014-75-C-0880

To summarize our main findings, we conclude that photolysis of Fe(CO)5 or Fe3(CO)12 yeidls an exceedingly active catalyst. The active catalyst is likely not an excited state species since the excited lifetimes of Fe(CO)5 or Fe3(CO)12 are too short to effect catalysis. The active species is likely an unsaturated ground state species photoproduced by loss of CO from Fe(CO)5 or Fe-Fe bond cleavage in Fe3(CO)12. Very high turnover rates for alkene isomerization and hydrosilation have been found. Moreover, very high turnover numbers (moles of product per mole of Fe initially present) are achieved. For example, when a single flash yields approximately 50% conversion of neat 1-pentene using approximately .01 m Fe(CO)5 the turnover number exceeds 400. Subsequent flashes yield an even greater extent conversion to ultimately completely equilibrate the linear pentenes. High light intensity does not appear to alter the product distribution where a number of products are possible (alkene + HSiEt3). The data show that very high light intensity can be used to produce product at a high observed rate and with high quantum efficiency (much greater than 1). (Author)

AD-A093 978/5 PC **A03**/MF **A01**
Texas A and M Research Foundation, College Station.
Ion-Atom Collisions.
Final rept. 1 Sep 79-30 Nov 80,
J. F. Reading, and A. L. Ford. 19 Dec 80, 27p
Contract N00014-79-C-0766

Theoretical studies of ion-atom collisions in the intermediate energy range have been carried out. Detailed comparisons to experimental measurements of the inner shell processes of ionization and charge transfer have been made. (Author)

AD-A094 004/9 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Temperature-Compensated High-Resolution Infrared Absorption Spectroscopy: Application to Carbon Monoxide.
Final rept. Oct 78-Jun 79,
C. J. Fisher, and W. P. Dixon. Jan 81, 32p Rept no. AEDC-TR-79-100
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

The analytic basis of an optical absorption technique suitable for a single line-of-sight determination of average gaseous species number densities in the presence of concentration, pressure and temperature gradients, and particulate loading is presented and applied to carbon monoxide (CO). Applying the technique involves using the power of very high-resolution infrared (IR) spectroscopy, now made available by tunable diode lasers. The method requires the construction of functions of molecular line strengths that are nearly temperature independent. A method of constructing these functions is described and applied to the case of CO. Possible applications to practical combustion systems are also outlined. (Author)

COO-4717-5 PC **A02**/MF **A01**
Texas A and M Univ., College Station. Dept. of Chemical Engineering.
Catalytic Conversion of Oxygenated Compounds to Low Molecular Weight Olefins. Progress Report, March 1, 1980-August 31, 1980.
R. G. Anthony. 30 Sep 80, 9p
Contract AS02-78PC04717

A possible route for producing low molecular weight olefins is to convert synthesis gas to methanol followed by conversion of methanol to olefins in a one-step process. During this report period the reaction apparatus suitable for reaction pressure of 500 to 1000 psig was constructed. A preliminary trial run was performed for the reaction of synthesis gas over an intimate mixture of methanol synthesis catalyst and Zeolon-500 (mixture of chabasite and erionite). The reaction temperature, pressure and space velocity were 400 exp 0 C, 800 psig, and 6000 h exp -1 (STP), respectively. The total carbon monoxide conversions were 15 to 24%. The major products were carbon dioxide and paraffins of C sub 1 to C sub 4 . Deactivation of the catalyst occurred after 10 hours. X-ray diffraction patterns of the catalyst shows that crystal structure changed during the reaction, and the catalyst exhibited low crystallinity compared to synthetic erionite. (ERA citation 06:006318)

N81-15728/1 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
Are the Numerical Methods and Software Satisfactory for Chemical Kinetics.
G. Dahlquist, L. Edsberg, G. Skoellermo, and G. Soederlind. 1980, 17p TRITA-NA-8005
Submitted for Publication. Presented at Intern. Workshop on Numerical Integration of Differential Equations, Bielefeld, (Germany, F.R.). 14-23 Apr. 1980.

The reliability of methods for the numerical integration of systems of differential equations describing chemical reactions is discussed. It is observed that in some situations the occurrence of instability may be detected by the computational program. It is suggested that the user be made aware of such dangers by the program documentation. It is demonstrated that there is a need for software which can easily utilize the user's knowledge of his problem in order to improve the reliability and efficiency of the computation.

N81-15742/2 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Intermolecular Forces of Infinite Range and the Boltzmann Equation.
L. Arkeryd. 1980, 14p CTH-MATH-1980-09

The space-homogeneous, nonlinear Boltzmann equation is considered for a class of encounters with infinite range, including inverse kth power molecules with k 3. Existence results are obtained in a generalized L(1)-sense. Two different methods of proof are given. The first method uses weak L(1)-convergence, as previously employed in the cut-off case. The second method relies on nonstandard techniques. The solutions obtained conserve 0th and 1st moments. A study of higher moments including conservation of energy is also included.

ORNL/CSD-72 PC **A02**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Mathmatics.
Observation on the Total Energy of a System with Phase Changes.
V. Alexiades, A. D. Solomon, and D. G. Wilson. Jan 81, 18p
Contract W-7405-ENG-26

In most heat transfer processes the choice of a reference energy and reference temperature are arbitrary, since only differences in energy and temperature are relevant to the transfer process. Thus, in applications to thermal energy storage, the total energy of a system will be obtained by integrating the temperature drop relative to an arbitrary reference temperature. The integral of the temperature drop will not yield a physically relevant total energy in a system with a phase change unless the reference point is chosen in a particular fashion. Indeed, conservation of energy constrains the choice of the melt temperature of the material as the reference point in a simple phase change process, while for multiple phase changes (as in iron), or variable melting temperatures (as in the solidification of an alloy), energy conservation places severe restrictions on the choice of the reference point. (ERA citation 06:006768)

PB81-141616 PC **A07**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Support Document, Test Data Development Standards, Physical/Chemical and Persistence Characteristics: Density/Relative Density, Melting Temperatures, Vapor Pressure, Octanol/Water Partition Coefficient, Soil Thin Layer Chromatography. Proposed Rule, Section 4, Toxic Substances Control Act,
George T. Armstrong, Robert H. Brink, and Asa Leifer. Oct 80, 147p EPA-560/11-80-027

This technical Support Document provides the rationale for the development of test standards to develop data on density/relative density, melting temperature, vapor pressure, octanol/water partition coefficient, and soil thin layer chromatography of chemical substances. EPA will use the data on these physical/chemical characteristics to evaluate the manner and extent of environmental transport, fate and places of deposit as an aid in assessing health and environmental effects of chemicals under TSCA. For density/relative testing, an analysis is given of available methods of determining this property of particular classes of materials with different physical characteristics. For melting temperature testing, available methods are analyzed in terms of materials with different physical characteristics. For vapor pressure, two procedures are given, the isoteniscope procedure for pressures of 0.1 to 100 kPa and a gas saturation (transpiration) procedure for pressures

of .00001 to the 1,000 Pa. The Knudsen effusion procedures are also given. How to determine the numerical values of the octanol/water partition coefficient are given. Soil thin layer chromatography, an experimental method for determining the relative mobility of organic chemicals in soils, is discussed, including scientific aspects of the method, and specific history and the rationale for selection of experimental conditions for this method.

PB81-144677 Not available NTIS
National Bureau of Standards, Washington, DC.
Thermochemical Equilibrium of Multiphase Solids Under Stress,
F. C. Larche, and J. W. Cahn. 1978, 11p
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Acta Metallurgica 26, p1579-1589 1978.

The internal and interface equilibrium of a multiphase multicomponent solid under non-uniform nonhydrostatic stress is examined at solid-fluid and two kinds of solid-solid interfaces, and in the presence or absence of mobile vacancies. Gibbs' solid-fluid equilibrium is not obtained unless vacancies are absent, or if one can assume that vacencies reach equilibrium that is localized at each interface. The two kinds of solid-solid surfaces called coherent and incoherent differ in the constraints imposed on allowed variations and lead to quite different equilibrium conditions.

PB81-144685 Not available NTIS
National Bureau of Standards, Washington, DC.
ToF Atom-Probe Mass Spectra of GaAs,
T. T. Tsong,, S. Ng. Yee, and A. J. Melmed. 1978, 6p
Grant NSF-DMR76-11418
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Surface Science Letter 77, pL187-L192 1978.

Time-of-flight mass analysis is applied to GaAs. Analyses are done in the presence of hydrogen and argon, as well as in vacuum. Significant differences are found in the spectra obtained under these conditions. Particularly interesting is the apparent specificity of hydrogen to react with As compared to Ga. The existence of the molecular ion As2(+1) is established.

PB81-144693 Not available NTIS
National Bureau of Standards, Washington, DC.
The Structure of (3-Chloro-2-hydroxy-5-nitrophenyl)(2'-chlorophenyl)iodonium hydroxide, Inner Salt,
Samuel W. Page, Eugene P. Mazzola, Alan D. Mighell, Vicky L. Himes, and Camden R. Hubbard. Sep 79, 3p
Sponsored in part by Food and Drug Administration, Washington, DC.
Pub. in Jnl. of American Chemical Society 101, n19 p5858-5860, 12 Sep 79.

C12H6NO3CI2I6 MW = 409.98; monoclinic, P2(1/n); a = 15.928(9); b = 18.271(6); c = 4.623(2)A, gamma = 105.58, z = 4; Dc = 2.106 g/cm; D(m) = 2.11 (floatation); final R = 0.060 (1787 observed reflections). The molecule exists as a zwitterion with an intramolecular I...O distance of 2.768(8)A. The I-C bond distances were found to be 2.08(1) and 2.11(1)A, with a C-I-C angle of 97.8(4). Intermolecular ionic attraction between I and O causes the formation of infinite chains along the z-axis of the cell. This zwitterion is the first reported example of a phenoxide-iodonium betaine. The title compound is a key intermediate in the synthesis of O-diphenyl ethers. A reaction mechanism based on the zwitterion formation is proposed.

PB81-144750 Not available NTIS
National Bureau of Standards, Washington, DC.
Collisional Effects in the Multi-Photon Dissociation of CF2CFCl,
J. Stone, E. Thiele, M. F. Goodman, J. C. Stephenson, and D. S. King. Sep 80, 12p
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Jnl. of Chemical Physics 73, n5 p2259-2270, 1 Sep 80.

The authors report results of a combined experimental and theoretical study of the effects of collisions with an inert buffer gas, on the CO2 laser induced MPD of CF2CFCl to form CF2 and CFCl. Rates of formation of the primary product CF2 have been determined, in real time using the laser excited fluorescence technique, at four IR laser intensities I(max)= 35, 47, 73 220 MW/square centimeter. Using only parameters determined in the MPD fit, the authors predict as a function of laser intensity and buffer gas pressure the energy absorbed from the light field. This prediction can be tested in an experiment that measures absorbed energy by the acousto-optic technique.

PB81-144768 Not available NTIS
National Bureau of Standards, Washington, DC.
The Geometry of CO and NO on Ru(001): Evidence for Bending Vibrations in Adsorbed Molecules,
Theodore E. Madey. 1979, 14p
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Surface Science 79, p575-588 1979.

As a test of the utility of the ESDIAD method (Electron Stimulated Desorption Ion Angular Distributions) in studies of the geometry of adsorbed molecules, the chemisorption of CO on Ru(001) has been examined. Data previously reported using UPS (ultraviolet photoemission spectroscopy) and EELS (electron energy loss spectroscopy) have indicated that CO is terminally bonded to the Ru surface through the C atom, with the CO axis perpendicular to the surface. The widths of the ion beams are temperature dependent; for both O(+1) + CO(+1) and approximately 12 degrees, the half widths at half maximum, alpha, of the ion cones are approximately 16 degrees at 300 K, and approximately 12 degrees at 90 K. This temperature dependence, coupled with a simple model calculation, indicates that the dominant factors contributing to the width of the ESD ion beams are the CO surface bending vibrations, i.e, initial state effects. Thus, the data suggest that both the directions and widths of ESDIAD beams are determined largely by the structure and dynamics of the initial adsorbed state.

PB81-144776 Not available NTIS
National Bureau of Standards, Washington, DC.
The Adsorption of Cycloparaffins on Ru(001) as Studied by Temperature Programmed Desorption and Electron Stimulated Desorption,
Theodore E. Madey, and John T. Yates, Jr. 1978, 18p
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Surface Science 76, p397-414 1978.

The adsorption of C2H6, and the cycloparaffins C3H6, C6H12, and C8H16 on Ru(001) at 80 K has been studied using LEED. The temperature was programmed for desorption and ESDIAD (Electron Stimulated Desorption Ion Angular Distributions). An aim of these studies has been to examine the relationship between ESDIAD ion desorption angles and bond angles in weakly adsorbed species having known internal structure.

PB81-144784 Not available NTIS
National Bureau of Standards, Washington, DC.
The Virial Series of the Ideal Base Gas,
Robert M. Ziff, and John M. Kincaid. Jan 80, 5p
Sponsored in part by National Science Foundation, Washington, DC., and American Chemical Society, Washington, DC.
Pub. in Jnl. of Math. Phys. 21, n1 p161-165 Jan 80.

The radius of convergence Rho(R) of the virial series of the d-dimensional ideal Bose gas is estimated by the method of Pade approximants, using at least thirty virial coefficients, which were numerically determined. A finite Rho(R) is found for d = 1 and 2, even though no phase transition occurs for these d. For d = 3, Rho(R) is consistent with Fuchs' analytical bounds, and for d = 4, 5, and 6, Rho(R) is equal to the critical density Rho(C). These results are supported by some analytic results for the equation of state.

PB81-147100 PC **A02**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Research Center.
An Environmental Evaluation of Polyethylene Oxide When Used as a Flocculant for Clay Wastes.
Rept. of investigations/1980,
Jalna R. Zatko. 1980, 18p BUMINES-RI-8438

The Bureau of Mines, U.S. Department of the Interior, has developed a novel method of flocculation dewatering of phosphatic clay wastes using polyethylene oxide as the flocculant. Research was conducted to determine whether ethylene oxide gas was present in the air in the vicinity of disposed waste materials which had been flocculated with polyethylene oxide. Samples of clay waste materials containing polyethylene oxide were prepared in stoppered glass bottles in simulated disposal environments. Gaseous samples, removed over a 75-day period using an airtight syringe, were injected into a gas chromatograph that was capable of separating ethylene oxide from air. The presence of ethylene oxide gas was not detected in any sample. To determine possible degradation products of polyethylene oxide, the properties and reactions of ethylene oxide and its polymers were reviewed. Based upon the literature survey and experimental study, it was concluded that adverse environmental effects were not likely to result from the use of polyethylene oxide for flocculating phosphatic clay waste products.

PB81-147118 PC **A02**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Low-Temperature Heat Capacities and High-Temperature Enthalpies of Chiolite (Na5Al3F14).
Rept. of investigations/1980,
J. M. Stuve, and M. J. Ferrante. 1980, 14p BUMINES-RI-8442

Low-temperature heat capacities of chiolite (Na5Al3F14) were determined by adiabatic calorimetry in the temperature range 5.8 to 300 K. The derived standard entropy (S, 298.15) was 115.6 plus or minus 0.2 cal/deg-mole. High temperature enthalpies relative to 198.15 K were obtained by precision drop calorimetry up to 1,000 K. Tables of experimental data and related thermodynamic functions are given for the temperature range of experimental observations.

PB81-147407 PC **A03**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Characterization of Thin Films and Solid Surfaces Using Proton-Induced X-Ray Emission.
Rept. of investigations/1980,
Bruce D. Sartwell, and Arthur B. Campbell, III. 1980, 27p BUMINES-RI-8455

The Bureau of Mines is using characteristic X-rays produced by proton bombardment of a solid surface to provide quantitative compositional analyses of surface layers of metals. An integral X-ray yield equation has been developed that quantitatively relates the measured X-ray yield to the thickness of thin films ranging from less than a monolayer to several thousand angstroms. The use of the integral yield equation is demonstrated for the growth of a thin film by vacuum evaporation. Results are presented that show how proton-induced X-ray emission (PIXE) has been used to determine the oxidation kinetics of iron that had been implanted with several different species of heavy ions. The sensitivity of PIXE for the measurement of very-thin-film growth kinetics is demonstrated from studies of the effect of fractional monolayer coverages of sulfur on the initial oxidation kinetics of iron. Results are also presented in which PIXE has been used to study the redistribution of alloying elements in components of a gas turbine that had fractured due to corrosion fatigue. By combining PIXE with low-energy ion sputtering, quantitative composition depth profiles of surface layers are obtained. Examples are presented for the profiling of iron samples implanted with 25-kev nickel ions and for a platinum coating on an Fe-5Cr substrate.

PB81-147423 PC **A02**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Thermodynamic Properties of Petalite (Li2Al2Si8O20).
Rept. of investigations/1980,

K. O. Bennington, J. M. Stuve, and M. J. Ferrante. 1980, 25p BUMINES-RI-8451

The thermodynamic properites of petalite ($Li_2Al_2Si_8O_{20}$) were determined by the Bureau of Mines. The enthalpy of formation was determined by hydrofluoric acid solution calorimetry. Low-temperature heat capacities were determined by adiabatic calorimetry from 10.69 to 302.11 K. Enthalpy increments above 298 K were measured by copper block calorimetry from 298 K to 1,193.6 K. The various experimental data were combined with other data from the literature to calculate the Gibbs energies of formation and equilibrium constants of formation over the temperature range of the measurements. Tables of enthalpies of formation and Gibbs energies of formation are given as a function of temperature from the elements and constituent oxides.

PB81-148207 PC **A03**/MF **A01**
Bureau of Mines, Salt Lake City, UT. Salt Lake City Research Center.
Analytical Chemistry of the Citrate Process for Flue Gas Desulfurization.
Information circular/1980,
W. N. Marchant, S. L. May, W. W. Simpson, J. K. Winter, and H. R. Beard. 1980, 27p BUMINES-RI-8819

The citrate process for flue gas desulfurization (FGD) is a product of continuing research by the U.S. Bureau of Mines to meet the goal of minimizing the objectionable effects of minerals industry operations upon the environment. The reduction of SO_2 in solution by H_2S to produce elemental sulfur by the citrate process is extremely complex and results in solutions that contain at least nine different sulfur species. Process solution analysis is essential to a clear understanding of process chemistry and its safe, efficient operation. The various chemical species, the approximate ranges of their concentrations in citrate process solutions, and the analytical methods evolved to determine them are hydrogen sulfide by specific ion electrode, polysulfides (unknown) by ultraviolet (UV) spectrophotometry, elemental sulfur by UV spectrophotometry, thiosulfate by iodometry or high performance liquid chromatography (HPLC), polythionates by thin layer chromatography (TLC), dithionite (searched for but not detected in process solutions) by polarography or TLC, bisulfite by iodometry, sulfate by a Bureau-developed gravimetric procedure, citric acid by titration or visible colorimetry, glycolic acid HPLC, sodium flame photometry, and chloride by argentometric titration.

PB81-148900 PC **A02**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Rapid, Low-Cost Analysis of Copper Slag for 13 Elements by Flame Atomic Absorption Spectroscopy.
Rept. of investigations/1980,
S. A. Matthes. 1980, 15p BUMINES-RI-8484

This Bureau of Mines report describes analysis of a copper slag for 13 elements from a single sample solution by flames atomic absorption spectroscopy. Sample are dissolved with 7 ml of an HCl-HF-HNO_3 (3:1.5:2) mixture in heated plastic pressure vessels. A 1.5-pct boric acid solution is added to dissolve precipitated fluorides and to reduce matrix effects that interfere with atomic absorption analysis. Preparation time is less than 1 hour per batch of 10 samples. Total analysis time is less than 6 person-hours for 130 determinations with an average relative standard deviation of 1.83 pct for the 13 elements. Simple acid standards were used for all determinations. Values obtained by this method are in excellent agreement with values obtained by slower, more costly procedures.

PB81-148926 PC **A02**/MF **A01**
EIC, Inc., Newton, MA.
Electrochemical Evaluation of the Electronic and Transport Properties of Silicon - Phase I.
Final rept. 1 Oct 79-31 Mar 80,
R. D. Rauh, R. H. Micheels, and R. Schiff. Mar 80, 25p NSF/RA-800312
Grant NSF-DAR79-17409

Measurement of the minority carrier diffusion length and the major carrier doping density of p- and n-type samples through the use of a liquid-semiconductor junction in an electrochemical cell has been demonstrated. Techniques employed make use of the Schottky-type barrier which forms between semiconductors and certain redox electrolytes. The electrical and optical properties of such a barrier can be used to determine doping densities, as well as carrier lengths, lifetimes, and mobilities. The CH_3OH, I-1/I2 redox electrolyte system was chosen because of its stability with respect to silicon passivation and its simplicity of preparation. Both the doping density and diffusion length can be measured in the same two-electrode cell with this redox electrolyte for either n- or p-type silicon samples for a large range of doping densities. Surface photovoltage and pulsed space-charge capacitance were employed because of their respective insensitivity to surface recombination and surface state effects. The electrochemical techniques used in this study provide rapid, reliable, and nondestructive measurements of semiconductor parameters which are essential in the evaluation of silicon used in the fabrication of electronic devices.

PB81-148959 PC **A02**/MF **A01**
Ionomet Co., Inc., Brighton, MA.
Vapor Deposited Silver Halides for Thin Layer Chromatography.
Final rept. 1 Oct 79-31 Mar 80,
Gershon M. Goldberg. Mar 80, 17p NSF/RA-800317
Grant NSF-PFR79-17476

Experiments were designed to determine the potential of using vapor deposited silver halide layers as athin layer chromatography (TLC) medium to effect separations of compounds difficult to separate on presently available TLC media. Objectives of this research included to find the most effective silver halide; to determine the influence of surface area of the deposit on separation efficiency; and to determine whether a reverse phase media could be prepared. Research methodology involved evaporating silver bromide and silver chloride on substrates of varying surface areas and then separating compounds capable of forming salts or complex ion with silver ion. Commercial materials were evaluated as media for separations. Direct spectrophotometry and photographic development were employed as detection techniques.

PB81-149049 PC **A02**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
A Simple, Low-Cost Method for the Dissolution of Metal and Mineral Samples in Plastic Pressure Vessels.
Rept. of investigations/1980,
R. F. Farrell, S. A. Matthes, and A. J. Mackie. 1980, 20p BUMINES-RI-8480

A goal of the U.S. Department of the Interior, Bureau of Mines, is the advancement of minerals technology through the development of improved metals and minerals processing. In support of this goal, the Bureau of Mines has developed a general method for preparing solutions from a wide range of metal and mineral samples for chemical analysis. The development of the method from current knowledge of vessel material, pressure dissolution techniques, and the fluoride-boric acid reaction is given. A copper slag and a steelmaking slag treated using this method were analyzed by atomic absorption spectroscopy, yielding values for Si, Mg, Ca, Al, Fe, Mn, Na, As, Pb, Sb, and Zn very close to certified values with an average relative standard deviation of 2.13 pct. The low cost, reduction in preparation time, ease and safety of sample handling, conservation of reagents, and ability to dissolve volatile materials without loss make this method superior to traditional wet digestion techniques for many materials, and ideal for use with atomic absorption, and optical emission or X-ray emission spectroscopy.

PB81-858540 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nuclear Magnetic Resonance of Solids. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 158p

This retrospective bibliography contains citations on the use of nuclear magnetic resonance spectroscopy as applied to studies of the solid state of matter. Much of the information contained in this summary focuses on the technique; however, specific information is given on organic solids, solid state biology, and semiconductors at low temperatures. (Contains 146 citations, fully indexed and including a table of contents.)

PB81-858557 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nuclear Magnetic Resonance of Solids. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Jan 81, 181p

Studies on the use of nuclear magnetic resonance spectroscopy as applied to studies of the solid state of matter are included in this bibliography. Much of the information contained in this summary focuses on the technique; however specific information is given on organic solids, solid state biology, and semiconductors at low temperatures. (Contains 175 citations, fully indexed and including a table of contents.)

PB81-858565 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Nuclear Magnetic Resonance of Solids. January, 1962-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 62-Dec 80.
Jan 81, 56p

This retrospective bibliography contains citations on the use of nuclear magnetic resonance spectroscopy as applied to studies of the solid state of matter. Much of the information contained in this summary focuses on the technique; however, specific information is given on organic solids, solid state biology, and semiconductors at low temperatures. (Contains 49 citations, fully indexed and including a table of contents.)

RFP-Trans-289 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Structure of Ferromagnetic Iron(III) Oxide, gamma -Fe sub 2 O sub 3.
R. Haul, and T. Schoon. 1939, 9p
Contract AC04-76DP03533
A, Z. Phys. Chem. (Leipzig), B, 44 P216-226 1939.

The known concepts of structure are critically discussed. The lattice constants were determined exactly for the following preparations: gamma -Fe sub 2 O sub 3 from Fe sub 3 O sub 4 , gamma -Fe sub 2 O sub 3 from Fe arc, gamma -Fe sub 2 O sub 3 from Fe(CO) sub 5 , a/sub w/ = 8.316 +- 0.004 A, a/sub w/ = 8.333 +- 0.004 A, and a/sub w/ = 8.3 A. This confirms Haegg's value of a/sub w/ = 8.32 A, which differs from previous lattice-constant determinations (a/sub w/ = 8.4 A). No significant difference in lattice constant or intensity distribution was found between the ferromagnetic iron(III) oxides prepared by the various methods. Several previously unobserved interferences were found in both the x-ray and electron-beam powder diagrams. These can be assigned only by assuming mixed indices, i.e., lower symmetry, or a larger unit cell. This result is in agreement with findings for the analogous gamma -Al sub 2 O sub 3 . The possible space groups are discussed to the extent permitted by the experimental results. (ERA citation 06:006317)

RFP-2986 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Search for an In-Line Nitric Acid Analyzer.
K. Y. Gallagher, and C. M. Johnson. Oct 80, 24p
Contract AC04-76DP03533

A literature search was conducted to identify possible techniques for measuring mineral acid normality in the presence of heavy metal salts, undissolved solids, and high radiation fields. Of the techniques noted, eight were identified that could be applicable to the objective. The possibilities were reduced to two methods, which warrant further in-

vestigation. These two are refractometry and a modified coulometric-polarographic method. All methods are discussed in detail followed by rationale for including or rejecting each for further investigation. (ERA citation 06:006286)

UCID-18567 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Current State of the Parametric Analysis of the Energy Levels of U I and U II.
K. Rajnak. Mar 80, 32p
Contract W-7405-ENG-48

Several computational advances have allowed us to assign nearly all levels of U I below 20,000 cm exp -1 and many beyond that. Parameter values are reported for the odd configurations f exp 3 ds exp 2 + f exp 3 d exp 2 s and the even configurations f exp 2 d exp 2 s exp 2 + f exp 3 s exp 2 p + f exp 4 s exp 2 , f exp 3 dsp and f exp 4 ds. Several remaining problems are pointed out. Tentative assignments of the lower levels of the previously unidentified f exp 2 d exp 3 s and f exp 3 d exp 3 configurations are made. For U II preliminary calculations have been carried out on the even configurations f exp 2 (ds exp 2 + d exp 2 s), f exp 4 s and f exp 4 d. (ERA citation 06:006670)

UCRL-53075 PC **A08**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Generation of Tunable Coherent Far-Infrared Radiation Using Atomic Rydberg States.
W. Bookless. Dec 80, 173p
Contract W-7405-ENG-48
Thesis.

A source of tunable far-infrared radiation has been constructed. The system has been operated at 91.6 cm exp -1 with a demonstrated tunability of .63 cm exp -1 . The system is based on a Rydberg state transition in optically pumped potassium vapor. The transition energy is tuned by the application of an electric field to the excited vapor. The transition wavelength and the shifted wavelength were detected and measured by the use of a Michelson interferometer and a liquid helium cooled Ga:Ge bolometer and the data was reduced using Fast Fourier transform techniques. Extensive spectroscopy was done on the potassium vapor to elucidate the depopulation paths and rates of the excited levels. Both theoretical and experimental results are presented to support the conclusions of the research effort. Additionally, possible alternative approaches to the population of the excited state are explored and recommendations are made for the future development of this source as well as the potential uses of it in molecular spectroscopy. (ERA citation 06:006671)

UCRL-85169 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Chemical Properties of Mendelevium.
E. K. Hulet. Nov 80, 12p
Contract W-7405-ENG-48

Even with the most intense ion beams and the largest available quantities of target isotope, about 10 exp 6 atoms at a time is all the Md that can be produced for chemical studies. This lack of sufficient sample size coupled with the very short lifetimes of the few atoms produced has severely restricted the gathering and the broadness of our knowledge concerning the properties of Md and the heavier elements. To illustrate, the literature contains a mere eleven references to the chemical studies of Md, and none of these deal with bulk properties associated with the element bound in solid phases. Some of these findings are: Md was found to be more volatile than other actinide metals which lead to the belief that it is divalent in the metallic state; separation of Md from the other actinides can be accomplished either by reduction of Md exp 3+ to the divalent state or by chromatographic separations with Md remaining in the tripositive state; extraction of Md exp 2+ with bis(2-ethylhexyl)phosphoric acid is much poorer than the extraction of the neighboring tripositive actinides; attempts to oxidize Md exp 3+ with sodium bismuthate failed to show any evidence for Md exp 4+ ; reduction potential of Md exp 3+ was found to be close to -0.1 volt; Md exp 3+ can be reduced to Md(Hg) by sodium amalgams and by electrolysis; the electrochemical behavior of Md is very similar to that of Fm and can be summarized in the equation, Md exp 2+ + 2e exp - = Md(Hg) and E exp 0 = -1.50 V.; and Md cannot be reduced to a monovalent ion with Sm exp 2+ . (ERA citation 06:006342)

7E. Radio and Radiation Chemistry

INIS-mf-5662 PC **A03**/MF **A01**
Instituto Politecnico Nacional, Mexico City. Escuela Superior de Fisica y Matematicas.
Description of the General Properties of Pionic Atoms.
B. R. Cervantes S. 1979, 42p
In Spanish.Thesis.
U.S. Sales Only.

The effects of the finite dimension of the nucleus and the strong interaction effects in the energy levels ls and 2p of pionic atoms are considered. The energy transition between these two levels are calculated using first-order perturbation theory, considering a uniform distribution of nuclear charge, for the effect of the finite dimension of the nucleus and one local optical potential as a model for the strong interaction. The calculations were realized for 13 elements and the results were compared with these experimentally obtained, founding a relative difference around of 4% was found. In conclusion the author observed that the effects of the finite dimension and the strong interaction can be considered as first-order perturbations in light atoms, and for heavy atoms these effects can be considered as second-order or higher perturbations. (Atomindex citation 11:539039)

PB81-144743 Not available NTIS
National Bureau of Standards, Washington, DC.
The Photochemistry of Ethyl Chloride,
David M. Shold, and Pierre J. Ausloos. 1979, 13p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Jnl. of Photochemistry 10, p237-249 1979.

Ethyl chloride and deuterium labeled ethyl chlorides have been photolyzed at 184.9, 163.3, 147.0, and 123.6 nm in the gas phase and at 163.3 and 147.0 nm in the liquid phase. The use of NO, O2, and HI as radical scavangers has permitted a determination of the quantum yields of primary photodecomposition processes as a function of wavelength. At low energies, excitation of an electron into an antibonding sigma* orbital leads primarily to C-Cl bond cleavage, while at higher energies this process is largely replaced by loss of HCl and hydrogen. Both 1,1- and 1,2 HCl eliminations are observed. The absence of significant amounts of H atom production at 163.3 nm and at low pressures suggests that one excited state may be responsible for HCl elimination, and a second for Cl atom loss, in agreement with the mechanism of Tschuikow-Roux et al.

8.
EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A093 585/8 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Microplanktonic ATP-Biomass and GTP-Productivity Associated with Upwelling off Pt. Sur, California.
Master's thesis,
Sherman Hughes Bronsink. Sep 80, 71p

Microplanktonic ATP-biomass and GTP-productivity were studied in upwelling features off Pt. Sur, California. Biomass, determined by adenosine triphosphate (ATP) and chlorophyll a, was found to have a definite preferential location in the strong gradients of temperature and nutrients on the equatorward edge of the feature. Productivity, as sampled using the new method of guanosine triphosphate (GTP) sampling was found to be high throughout the thermo-nutrient gradient associated with an upwelling feature in an early stage of development. The measurement of productivity and 'growth potential' using GTP and GTP/ATP ratios was found to be a valuable tool in examining rapidly changing upwelling features. Preliminary results obtained using the GTP technique suggests a relationship between the flux of nutrients across ocean fronts and planktonic productivity associated with frontogenic coastal upwelling systems. (Author)

AD-A093 723/5 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Foraminifera and Chlorophyll Maximum: Vertical Distribution, Seasonal Succession, and Paleoceanographic Significance.
Journal article.
Richard G. Fairbanks, and Peter H. Wiebe. 24 Mar 80, 5p
Contract N00014-74-C-0262
Pub. in Science, v209 p1524-1526, 26 Sep 80. Prepared in cooperation with Lamont-Doherty Geological Observatory, Palisades, NY, Rept. no. LDGO-3017.

No abstract available.

AD-A093 942/1 Not available NTIS
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Vocalizations and Feeding behavior of the Killer Whale (Orcinus orca).
William W. Steiner, James H. Hain, Howard E. Winn, and Paul J. Perkins. 15 Nov 78, 5p
Contract N00014-76-C-0226
Availability: Pub. in Jnl. of Mammalogy, v60 n4 p823-827 Nov 79 (No copies furnished by DTIC/NTIS).

No abstract available.

PB81-148876 Not available NTIS
Washington Univ., Seattle. Div. of Marine Resources.
Conservation and Management of Whales,
K. Radway Allen. c1980, 116p ISBN-0-295-95706-9, NOAA-80101503
Grant NA79AA-D-00054
Library of Congress catalog card no. 79-90505.
Available from University of Washington Press, Seattle, WA. 98195, PC$12.50.

Over the last decade, the commercial exploitation of whales has become a matter of increasing public concern. This book outlines the main concepts and techniques which have gradually evolved in the study of whale populations, and reviews their application to the difficult problem of managing these resources. There is a description of the principal characteristics of whales, along with their social structure, food, distribution and migration, stock separation, reproduction, and natural mortality rates. A brief history is also presented of the whaling industry and the history of its regulation by the International Whaling Commission.

PB81-155566 PC **A02**
North Carolina State Univ. at Raleigh. Dept. of Zoology.
A Method for Measuring Ingestion Rate of Deposit Feeders and Its Use with the Polychaete 'Nereis succinea'.
Sea Grant reprint,
Leon M. Cammen. c1980, 8p UNC-SGR-167, NOAA-80120909
Pub. in Estuaries, v3 n1 p55-60 Mar 80.

In situ ingestion rates of some infaunal deposit feeders can be determined without collecting feces by labeling the sediment with fluorescent particles and using these to trace ingested material through the gut of the animals. This technique was applied to the polychaete Nereis succinea and

showed that ingestion rate, expressed as material ingested per body weight, increased with temperature and decreased with body size. Total annual ingestion of sediment and detritus for a N. succinea population in a salt marsh near Beaufort, N.C., was estimated to be 5 kg of dry material sq m, more than 4 times that reported for salt marsh epifaunal deposit feeders. (Copyright (c) 1980 Estuarine Research Federation.)

PB81-158321 PC **A03**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Botany.
Preliminary Energy Budget for a Salt Marsh in the Cape Fear River Estuary, North Carolina.
Working paper,
Leon M. Cammen, Udo Blum, Ernest D. Seneca, and Linda M. Stroud. Oct 80, 39p UNC-SG-WP-80-3, NOAA-80123003
Grant NA-79AA-D-0048

A band of salt marshes dominated by the cordgrass Spartina alterniflora extends along much of the East and Gulf Coasts of the United States. In order to examine more closely the exchange of material between the emergent marsh and the estuary in North Carolina, an energy budget was constructed for the emergent marsh at Walden Creek, part of the Cape Fear River Estuary system. This budget is a synthesis of measurements of the major pathways of energy flow through this site and adjacent sites plus values drawn from the literature to estimate the pathways which were not measured. This energy budget is compared with those developed for other marsh systems and some of the factors affecting the form and amount of export of carbon to the Cape Fear River Estuary ecosystem is discussed.

8B. Cartography

N81-15429/6 PC **A05**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Reports on Cartography and Geodesy. Series 1: Original Reports, Number 78 Nachrichten Aus Dem Karten- und Vermessungswesen.
1979, 91p ISSN-0469-4236
In German; English Summary. Original Contains Color Illustrations.

No abstract available.

N81-15438/7 PC **A09**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Reports on Cartography and Geodesy. Series 1: Original Reports, Number 79 Nachrichten Aus Dem Karten- und Vermessungswesen.
1979, 178p ISSN-0469-4236
In German; English Summary. Original Contains Color Illustrations.

No abstract available.

8C. Dynamic Oceanography

AD-A093 452/1 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. Great Lakes Coastal Research Lab.
Application of Short-Crested Wave Theory in the Design of Three Dimensional Coastal Hydrodynamic Models.
Final rept. May 75-Sep 80,
William L. Wood. Sep 80, 36p
Contract N00014-75-C-0716

In spring 1973 a series of field experiments was initiated to investigate the three dimensional structure of a coastal hydrodynamic system. These field investigations supported the concept that short-crested wave theory is applicable to modeling of incident wind-wave transformations from offshore to the outer surf zone. Application of short-crested wave theory to the design of coastal hydrodynamic models was also considered appropriate because of the theories inherent three dimensional structure. Concurrent with this work two field experiments were conducted in 1974 and 1976 to measure vertical and horizontal distribution of longshore current velocity and to monitor temporal variations in current velocity at a point. In fall 1978 a series of experimental laboratory investigations was initiated to make precise measurements, at close spatial intervals, of wave height decay after breaking. These experiments were carried out to determine a wave height decay expression based upon the assumption that an appropriate physical conceptualization of wave energy dissipation after breaking must consider turbulence dominant to bottom friction. This report presents a detailed summary of these investigations and their results. (Author)

AD-A093 475/2 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Oceanography.
Efficiency of Conversion of Kinetic Energy to Potential Energy by a Breaking Internal Gravity Wave,
Rory O. Rafi Y. Thompson. 26 Nov 79, 6p Rept no. 172
Contract N00014-75-C-0201
Pub. in Jnl. of Geophysical Research, v85 nC11 p6631-6635, 20 Nov 80.

No abstract available.

AD-A093 559/3 PC **A03**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Ocean Wave Measurement Techniques,
R. H. Stewart. 1980, 27p
Contract N00014-75-C-0152
Pub. in Air-Sea Interaction, p447-470 1980.

No abstract available.

AD-A093 603/9 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Sea Levels and Metered Currents off Central California.
Master's thesis,
Donald A. Dreves. Sep 80, 95p

Sea levels from two locations, the alongshore sea level gradient and direct measurement of currents by moored current meters are examined and discussed. The observations were made off the central California coast during the Davidson Current period 1978-9. Analysis for spectral variance of hourly and low pass filtered sea levels, alongshore sea level gradient and alongshore and cross shelf currents was performed. Comparison of spectral estimates of low pass filtered data indicate that current and sea level gradient energy distributions are in close agreement. This is interpreted to suggest that a relationship may exist between the observed currents and the longshore sea level gradient. In contrast, the low pass filtered sea level spectrum indicates energy concentrated at lower frequencies than was observed for currents. (Author)

AD-A093 687/2 PC **A05**/MF **A01**
Delaware Univ., Newark. Dept. of Civil Engineering.
A Numerical Model for Nearshore Circulation Including Convective Accelerations and Lateral Mixing.
Technical rept.,
Bruce A. Ebersole, and Robert A. Dalrymple. Jul 79, 94p Rept nos. OCEAN ENGINEERING-21, TR-4
Contract N00014-76-C-0342

A finite difference model for predicting the nearshore circulation due to wind and waves is presented which attempts to solve the same problem as an earlier model created by Birkemeier and Dalrymple (1975). Their model iteratively solved the linear set of conservation equations of both mass and momentum, which were time averaged (over one wave period) and depth integrated, for mean velocities and free surface displacements. The wave characteristics used in the momentum equations were found using the wave refraction and shoaling routines, including wave-current interaction, developed by Noda, et al. (1974). The model also included a linear bottom friction formulation as well as a surface wind stress capability. The present model discussed herein includes the addition of convective accelerations, horizontal mixing and a quadratic bottom friction term in the conservation of momentum equations. This bottom friction term is 'exact' in the sense that it includes the velocity vectors due to both mean and wave-induced currents. The model is applied to the cases of a single wave train impinging on a plane beach, a barred profile, and a bottom with a periodically spaced rip channel.

AD-A093 813/4 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Distortion of Internal Wave Patterns by Background Shear: A Case Study.
Interim rept.,
Thomas H. Bell, Jr. 26 Dec 79, 24p Rept no. NRL-8362

A preliminary comparative study was made of the structure of numerically simulated internal wave patterns with and without background shear. The analysis focuses on two distinct aspects of the wave pattern: the energy envelope (that region of space within which appreciable density perturbations occur); and the phase information (the structure of the density perturbations within the energy envelope). Using real background oceanographic data, we examine how the energy envelope and phase information observed in the absence of shear are distorted by the presence of background shear. The relevant parameter for determining the relative importance of background shear is shown to be the bulk, rather than local, Richardson number, defined in terms of characteristic density and velocity variations over the characteristic dimensions of the wave pattern, rather than in terms of local derivatives of the background density and velocity profiles. Because of the influence of the larger scale, averaged properties of the shear profile on the wave propagation process, the net drift velocity of the energy envelope at any depth level does not accurately reflect the background current speed at that level. Sheer induced restrictions of the vertical extent of the energy envelope are shown to be consistent with elementary wave propagation arguments relating to the so-called critical layer phenomenon. Insofar as the phase information is concerned, we find significant coherence losses (relative to unsheared patterns) over several Brunt-Vaisala periods.

AD-A093 993/4 PC **A02**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents Northwest Indian Ocean Including the Arabian and Laccadive Seas.
Final rept.
Oct 77, 21p Rept no. NOO-SP-1404-IN1

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. This surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A093 994/2 PC **A02**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Northeast Indian Ocean Including the Bay of Bengal, Andaman Sea and South China Sea.
Final rept.
Oct 77, 21p Rept no. NOO-SP-1404-IN2

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. This surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A093 995/9 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Central Indian Ocean.
Final rept.
Sep 77, 27p Rept no. NOO-SP-1404-IN4

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. This surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A093 996/7 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. East Central Indian Ocean Including the East Indian Archipelago (Indonesia).
Final rept.
Aug 77, 27p Rept no. NOO-SP-1404-IN5

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A093 997/5 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Southwest Indian Ocean.
Final rept.
Sep 77, 28p Rept no. NOO-SP-1404-IN6

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A093 998/3 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. South Central Indian Ocean.
Final rept.
Sep 77, 27p Rept no. NOO-SP-1404-IN7

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A093 999/1 PC **A02**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Southeast Indian Ocean Including the Great Australian Bight.
Final rept.
Oct 77, 25p Rept no. NOO-SP-1404-IN8

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A094 012/2 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Northeast North Atlantic Ocean.
Final rept.
Jan 78, 28p Rept no. NOO-SP-1400-NA5

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A094 013/0 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Southwest South Pacific Ocean including the Tasman Sea.
Final rept.
Jun 78, 26p Rept no. NOO-SP-1403-SP4

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually compiled editions printed in the mid-thirties. The surface current information is based on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A094 014/8 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Southwest Central South Pacific Ocean.
Final rept.
Nov 77, 28p Rept no. NOO-SP-1403-SP5

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever suffcient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A094 015/5 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents. Southeast Central South Pacific Ocean.
Final rept.
Nov 77, 28p Rept no. NOO-SP-1403-SP6

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

PB81-135352 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Seattle, WA. Pacific Marine Environmental Lab.
Circulation in the Strait of Juan de Fuca: Recent Oceanographic Observations in the Eastern Basin,
J. R. Holbrook, R. D. Muench, D. G. Kachel, and C. Wright. Apr 80, 48p NOAA-TR-ERL-412, PMEL-33, NOAA-80120402
See also report dated Jun 78, PB-293 514.

In two field experiments conducted in the eastern Strait of Juan de Fuca during winter 1977-78 and summer 1978, 3-mo time series measurements of currents, over-the-water winds, shore winds, and water properties were obtained. From these data sets, the principal water motions are identified and described in the report. Although local winds play a minor role in modifying near-surface circulation, coastal storms dramatically affect circulation in the eastern basin.

PB81-153900 PC **A08**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC.
The System of Equatorial Countercurrents in the Ocean,
N. K. Khanaichenko. c1980, 168p TT-76-52005
Trans. of mono. Sistema E'kvatorial'nykh Protiocotechenii v Okeane, Leningrad, 1974, by R. K. Mishra. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

This book deals with one of the most important problems of oceanic circulation: it describes the problem of equatorial undercurrents. Using the data already available in conjunction with some new measurements of basic hydrological characteristics of equatorial undercurrents, the author has attempted to answer the following questions: What is the nature of these undercurrents. Why and where do they originate. What physical model may describe this phenomenon. The equatorial undercurrents in the regions of the Indian, the Atlantic and the Pacific oceans are compared.

PB81-802951 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tsunamis. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 231p
Supersedes PB80-803083, and NTIS/PS-78/1303.

Predictions, effects, and protective measures relative to tsunamis are reviewed. Harbors, river basins, and coastal regions are among the areas investigated. (This updated bibliography contains 226 citations, 8 of which are new entries to the previous edition.)

8E. Geodesy

AD-A093 780/5 PC **A04**/MF **A01**
Hughes Research Labs., Malibu, CA.
Review of Artificial Satellite Gravity Gradiometer Techniques for Geodesy.
Research rept.,
Robert L. Forward. May 73, 58p Rept no. HAC-RR-469
Presented at the International Symposium on the Use of Artificial Satellites for Geodesy and Geophysics, (1st) Athens (Greece) 14-21 May 73.

This paper reviews the development status of gravity gradiometer instrumentation and the utilization of these gradiometers in earth orbiting artificial satellites for geodesy. Recent studies have shown that gravity gradiometers in artificial satellites operated in a low altitude polar orbit could produce in

20 to 30 days a complete map of the higher order harmonics (25 to 75 degree and order) of the earth's gravity field provided the instrumentation flown has a sensitivity of 0.01 EU (10 to the minus 11 sec to the -2 = 1 ngal/m) for a 35 sec integration time. During the past decade gravity gradiometer development efforts have produced instrumentation which have measured gravity gradients in the laboratory and in orbit and which can be made to operate at the 0.01 EU sensitivity level in an orbital environment. Special emphasis is placed on the instrument concepts that can easily be increased in size from their present configuration to obtain the desired sensor signal-to-noise and which use spacecraft rotation modulation of the gravity gradient signal to aid in reducing externally generated noise to below the 0.01 EU level. (Author)

AD-A093 909/0 Not available NTIS
Stanford Univ., CA. Dept. of Computer Science.
Large-Scale Geodetic Least-Squares Adjustment by Dissection and Orthogonal Decomposition,
Gene H. Golub, and Robert J. Plemmons. 7 Nov 79, 27p ARO-14692.7-M, ARO-16037.2-M
Grants DAAG29-78-G-0179, NSF-MCS78-11985
Prepared in cooperation with Tennessee Univ., Knoxville, Grant DAAG29-77-G-0166.
Availability: Pub. in Linear Algebra and Its Applications, v34 p3-28 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

DOE/ID/12079-13 PC **A05**/MF **A01**
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
GRAV2D: An Interactive 2-1/2 Dimensional Gravity Modeling Program (User's Guide and Documentation for Rev.1).
C. Nutter. Nov 80, 93p ESL-42
Contract AC07-79ID12079

GRAV2D is an interactive computer program used for modeling 2-1/2 dimensional gravity data. A forward algorithm is used to give the theoretical attraction of gravity intensity at a station due to a perturbing body given by the initial model. The resultant model can then be adjusted for a better fit by a combination of manual adjustment, one-dimensional automatic search, and Marquardt inversion. GRAV2D has an interactive data management system for data manipulation and display built around subroutines to do a forward problem, a one-dimensional direct search and an inversion. This is a user's guide and documentation for GRAV2D. (ERA citation 06:005963)

DOE/ID/12079-16 PC **A03**/MF **A01**
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
GM3D: Interactive Three-Dimensional Gravity and Magnetic Modeling Program (GM3D.REV1 User's Guide).
J. Maurer, and J. W. Atwood. Oct 80, 31p ESL-44
Contract AC07-79ID12079

GM3D has been developed for computering the gravity or magnetic anomaly due to a three-dimensional body, and for plotting the resulting contour map. A complex body may be constructed from several right-rectilinear vertical-sided prisms. The program allows the input and editing of the prism data which are then used to calculate the anomaly map for plotting. Plotting is done on either a Tektronix 4014 graphics terminal, a Statos electrostatic plotter, or a CalComp pen plotter. A terminal plot is also available which can be printed on any terminal and on a line printer. The program is written in FORTRAN IV code and operates on a PRIME 400 computer system. Adaptation of the program to other systems is relatively straightforward. (ERA citation 06:005964)

N81-15448/6 PC **A05**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Latitude and Longitude Studies at the Satellite Observation Station Wettzell.
1979, 94p SER-B-242-MITT-156, ISSN-0071-9196
In German; English Summary.

No abstract available.

8G. Geology and Mineralogy

AD-A093 467/9 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Diatom Biostratiography and Its Relationship to Paleomagnetic Stratigraphy and Molluscan Distribution in the Neogene Centerville Beach Section, California.
Journal article,
L. H. Burckle, J. R. Dodd, and R. J. Stanton, Jr. 29 Jun 79, 12p Rept no. LDGO-2960
Contract N00014-75-C-0210, Grant NSF-OCE76-18049
Pub. in Jnl. of Paleontology, v54 n4 p664-674 Jul 80.

No abstract available.

AD-A093 468/7 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Rate of Cenozoic Explosive Volcanism in the North Atlantic Ocean Inferred from Deep Sea Cores.
Journal article,
W. L. Donn, and D. Ninkovich. 7 Dec 79, 7p Rept no. LDGO-3011
Contract N00014-75-C-0210, Grant NSF-OCE76-18049
Pub. in Jnl. of Geophysical Research, v85 nB10 p5455-5460, 10 Oct 80.

No abstract available.

CEA-R-5008 PC **A17**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Oklo Natural Nuclear Reactors: Neutron Parameters, Age and Duration of the Reactions, Uranium and Fission Products Migrations.
J. C. Ruffenach. Sep 79, 381p
In French.Thesis.
U.S. Sales Only.

Mass spectrometry and isotopic dilution technique are used in order to carry out, on various samples from the fossil nuclear reactors at Oklo, Gabon, isotopic and chemical analyses of some particular elements involved in the nuclear reactions: uranium, lead, bismuth, thorium, rare gases (krypton, xenon), rare earths (neodymium, samarium, europium, gadolinium, dysprosium), ruthenium and palladium. Interpretations of these analyses lead to the determination of many neutron parameters such as the neutron fluence received by the samples, the spectrum index, the conversion coefficient, and also the percentages of fissions due to uranium-238 and plutonium-239 and the total number of fissions relative to uranium. All these results make it possible to determine the age of the nuclear reactions by measuring the amounts of fission rare earths formed, i.e. 1.97 billion years. This study brings some informations to the general problem of radioactive wastes storage in deep geological formations, the storage of uranium, plutonium and many fission products having been carried out naturally, and for about two billion years. (Atomindex citation 11:521647)

DOE/METC/12142-26 PC **A09**/MF **A01**
Illinois State Geological Survey, Urbana.
Geologic and Geochemical Studies of the New Albany Shale Group (Devonian-Mississippian) in Illinois. Final Report.
R. E. Bergstrom, and N. F. Shimp. 30 Jun 80, 190p
Contract AC21-76ET12142

The Illinois State Geological Survey is conducting geological and geochemical investigations to evaluate the potential of New Albany Group shales as a source of hydrocarbons, particularly natural gas. Geological studies include stratigraphy and structure, mineralogic and petrographic characterization; analyses of physical properties; and development of a computer-based resources evaluation system. Geochemical studies include organic carbon content and trace elements; hydrocarbon content and composition; and adsorption/desorption studies of gas through shales. Separate abstracts have been prepared for each task reported. (ERA citation 06:005753)

N81-15426/2 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Interpretation of Satellite Images of the Republic of Niger.
Final rept.,
F. Bender, and D. Bannert. Jan 81, 86p NASA-TM-76476, BMZ-7521373
Contract NASW-3199
Transl. Into English of "Interpretation d'Images de Satellite en Republique du Niger" Bmz Proj. Rept. 7521373 Bundesanstaldt fuer Geowissenschaften und Rohstoffe, Hanover, (Germany, F.R.), 20 Apr. 1979 p 1-124. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Interpretations of LANDSAT pictures were carried out for an area located in the west of the Niger Republic in the geological, hydrogeological and pedological sectors. Checking of the extent of vegetation and use of the soils and effects of desertification for the purpose of yearly map making was carried out. The proposed control of land use may be optimized by the direct reception of LANDSAT data by the receiving station planned for Ouagadougou. Since that station will not be operating before 1983, the establishment of a mobile reception station in the Republic of Niger to enable the installation of the required control system is advised.

PB81-151995 PC **A09**/MF **A01**
Bureau of Mines, Amarillo, TX. Helium Operations.
Helium-Its Relationship to Geologic Systems and Its Occurrence with the Natural Gases, Nitrogen, Carbon Dioxide, and Argon.
Rept. of investigations/1980,
Claude A. Tongish. 1980, 185p BUMINES-RI-8444
Portions of this document are not fully legible.

This Federal Bureau of Mines report presents information on the accumulation and distribution of helium in U.S. natural gas reservoirs. The investigation concerns the relationship or association of helium with geographic location, geologic age, reservoir depth, nitrogen, carbon dioxide, and argon. The report is based on gas analysis information collected by the Bureau from 1917 to 1974 from 10,086 gas samples, representing 6,455 reservoirs in 35 States. Results of the various correlations are presented in tables and charts. Relationships have also been determined quantitatively by measures of correlation. The statistical data can be used to determine the environment under which reservoirs with high-helium contents are most likely to occur. These data can be used with other information for predicting the future helium resources of the United States.

UCID-18688 PC **A06**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Site Characterization: A Spatial Estimation Approach.
J. V. Candy, and N. Mao. Oct 80, 124p
Contract W-7405-ENG-48

In this report the application of spatial estimation techniques or kriging to groundwater aquifers and geological borehole data is considered. The adequacy of these techniques to reliably develop contour maps from various data sets is investigated. The estimator is developed theoretically in a simplified fashion using vector-matrix calculus. The practice of spatial estimation is discussed and the estimator is then applied to two groundwater aquifer systems and used also to investigate geological formations from borehole data. It is shown that the estimator can provide reasonable results when designed properly. (ERA citation 06:005492)

UCID-18853 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Transient Two-Dimensional Flow in Porous Media.
L. Sharpe, Jr. 14 Sep 79, 43p

Contract W-7405-ENG-48

The transient flow of an isothermal ideal gas from the cavity formed by an underground nuclear explosion is investigated. A two-dimensional finite element method is used in analyzing the gas flow. Numerical results of the pressure distribution are obtained for both the stemming column and the surrounding porous media. (ERA citation 06:005499)

USGS-OFR-80-942 PC **A05**/MF **A01**
Geological Survey, Denver, CO.
Geology of the Syncline Ridge Area Related to Nuclear Waste Disposal, Nevada Test Site, Nye County, Nevada.
D. L. Hoover, and J. N. Morrison. 1980, 88p
Contract AI08-78ET44802

The Syncline Ridge area is in the western part of Yucca Flat, Nye Co., Nev. Drill holes, geophysical surveys, mapping, and laboratory studies during 1976 through 1978 were used to investigate argillite in unit J (Mississippian) of the Eleana Formation (Devonian and Mississippian) as a possible nuclear waste repository site. Argillite in unit J has a minimum stratigraphic thickness of at least 700 m. The argillite underlies most of the Syncline Ridge area east of the Eleana Range, and is overlain by Quaternary alluvium and the Tippipah Limestone of Syncline Ridge. At the edges of the Syncline Ridge area, alluvium and volcanic rocks overlie the argillite. The argillite is underlain by more than 1000 m of quartzite, siliceous argillite, and minor limestone in older units of the Eleana Formation. These older units crop out in the Eleana Range. The area is divided into southern, central, and northern structural blocks by two lateral faults. The southern and central blocks either have volumes of argillite too small for a repository site, or have irregular-shaped volumes caused by Mesozoic high-angle faults that make the structure too complex for a repository site. The northern block appears to contain thick argillite within an area of 6 to 8 km exp 2. The postvolcanic history of the Syncline Ridge area indicates that the area has undergone less deformation than other areas in Yucca Flat. Most of the late Tertiary and Quaternary deformation consisted of uplift and eastward tilting in the Syncline Ridge area. Preliminary engineering geology investigations indicate that although the competency of the argillite is low, the argillite may be feasible for construction of a nuclear waste disposal facility. Physical, thermal, chemical, and mineralogical properties of the argillite appear to be within acceptable limits for a nuclear waste repository. (ERA citation 06:005300)

8H. Hydrology and Limnology

PB81-148074 PC **A03**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
Input into and Fate of Lead in a Small Reservoir.
Technical completion rept. (Final),
Alan W. McIntosh, Joseph V. Hunter, and Patrice Krug. Oct 80, 39p W81-01045, OWRT-A-056-NJ(1)
Contract DI-14-34-0001-0132

Lead (Pb) concentrations in water samples collected from seven sites in Weston's Mill Pond, NJ, a water supply/recreaction reservoir exposed to substantial amounts of highway runoff, under varying meteorological conditions ranged from 18.3 to 34.9 ug/l. Highest average concentration over all sites (46.4 ug Pb/l) occurred after a period of heavy rainfall. The non-filterable fraction accounted for 80 to 96 percent of the total lead present in the water. Estimated loading of lead to the reservoir via a major tributary during a storm event was 3.22 pounds, with levels in the tributary reaching a maximum of 1.94 mg Pb/l during the storm.

PB81-148124 PC **A03**/MF **A01**
Texas Dept. of Water Resources, Austin.
Occurrence and Quality of Ground Water in the Edwards-Trinity (Plateau) Aquifer in the Trans-Pecos Region of Texas,
Rhys Rees, and A. Wayne Buckner. Sep 80, 49p TDWR/R-255

The Edwards-Trinity (Plateau) aquifer, which consists of limestones and sands of Cretaceous age, is one of the most important sources of water in Reeves, Pecos, and Terrell Counties. The aquifer has an areal extent of approximately 9,400 square miles (24000 sq km). In small localized areas, the aquifer yields large quantities of water to wells, principally for irrigation use. However, throughout most of the aquifer's exent, it yields only small to moderate amounts of water to wells. The geology of the aquifer, particularly the structure, strongly influences on both the yields of wells and the chemical quality of the water. It appears from the long-term water level declines that pumpage in the irrigated areas of the aquifer has, in many places, exceeded recharge. Before extensive development of irrigation wells, the discharge from the aquifer was in equilibrium with recharge. However, with the development of large-scale irrigation, discharge has exceeded recharge in most of the irrigation areas and water has been withdrawn from storage. This has caused long-term water level declines. The quality of water within the aquifer varies from less than 500 to more than 5,000 milligrams per liter (mg/l) dissolved solids. The high amount of dissolved solids in water contained in the aquifer is primarily the result of recharge water from evaporite deposits.

PB81-150575 PC **A03**/MF **A01**
National Board of Waters, Helsinki (Finland). Water Research Inst.
Phosphorus and Organic Matter Discharged by Finnish Rivers to the Baltic Sea (Suomen Jokiveslen Itaemereen Kuljettama Fosfori ja Orgaaninen Aine),
Jyrki Wartiovaara. 1978, 50p ISBN-951-46-3692-9, 29
Also pub. as ISSN-0355-0982.

The amounts of phosphorus and organic matter discharged by Finnish rivers to the Baltic Sea are evaluated; as well as the discharges of nitrogen, suspended solids and electrolytes. The data comprises daily streamflow observations and analyses of 820 water samples from the estuaries of 21 rivers for the period 1974-1976. The differences in the amounts of matter discharged annually primarily reflect the variation in the streamflow. The parameters humic color, iron and phosphorus are clearly interrelated.

PB81-150898 PC **A08**/MF **A01**
Carr Research Lab., Inc., Wellesley, MA.
Integrated Iron and Nitrogen Control for Lake Restoration,
Jerome B. Carr. Nov 79, 175p
Grant EPA-S-804696010
Sponsored in part by Wellesley Dept. of Public Works, MA.

The project is unique in that nitrogen is the focus of the lake management program; whereas phosphorus is the focus in all the other Clean Lake Programs. In addition, this program is unique in that it deals with the impact of the micro-nutrient iron in the aquatic environment. By controlling iron, nuisance blue-green algal blooms may be brought under control. Morses Pond in Wellesley, Massachusetts was given three different treatments to remove the iron and control the algae.

PB81-151649 PC **A05**/MF **A01**
Geological Survey, Tallahassee, FL. Water Resources Div.
Model Evaluation of the Hydrogeology of the Morris Bridge Well Field and Vicinity in West-Central Florida.
Water-resources investigations,
Paul D. Ryder, Dale M. Johnson, and James M. Gerhart. 1980, 100p USGS/WRI-80-29, ISGS/WRD/WRI-81/005
Prepared in cooperation with Southwest Florida Water Management District, Brooksville.

The Morris Bridge well field is being developed to augment the city of Tampa's water supply that now comes from the Hillsborough River. The maximum well-field withdrawal may equal 40 million gallons per day. The water will be pumped from the Floridan aquifer. Two-dimensional and three-dimensional digital flow models were used to evaluate the hydrogeology of the area. Model-derived transmissivity values for the Floridan aquifer ranged from 37,000 to 600,000 feet squared per day. Model-derived specific yield values for the surficial aquifer ranged from 0.05 to 0.30. The three-dimensional model was used to predict drawdowns in both the Floridan and surficial aquifers in response to a 40 million gallon per day stress.

PB81-152035 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. School of Civil and Environmental Engineering.
Development of a Model for Estimating the Extent of River Flooding with Satellite and In situ Data.
Technical completion rept.,
W. R. Philipson, J. N. McLeester, and W. R. Hafker. Nov 80, 28p W81-01203, OWRT-A-089-NY(1)
Contract DI-14-34-0001-0134

The value and use of Landsat satellite data for obtaining information on flooding were assessed in this study of the Black River Basin in northern New York. The investigation had three parts. Initially, the reliability of delineating flood-affected areas from Landsat data was established by comparison with flood boundaries derived from aerial photographs of a different but similar flood. It was established that the delineation of flood-affected areas could be performed through visual analysis of band 7 (near-infrared) Landsat images as reliably as it could through color-additive viewing or digital analysis using all Landsat bands or scenes of different dates (flooding and no flooding). Also, a preliminary predictive model was developed which uses in situ measurements of river discharge to estimate the extent of flooding.

PB81-153736 PC **A04**/MF **A01**
Geological Survey, Boise, ID. Water Resources Div.
Using Channel Geometry to Estimate Flood Flows at Ungaged Sites in Idaho.
Water-resources investigations (Final),
W. A. Harenberg. Aug 80, 60p USGS/WRD/WRI-81/002, USGS/WRI-80-32
Prepared in cooperation with Idaho Transportation Dept., Boise. Errata sheet inserted.

Measurements at bankfull stage were made at 136 sites to determine whether predictions of flood discharges using channel-geometry characteristics are as good as or better than predictions using basin characteristics. These measurements are used to determine the variables of bankfull width, area, depth, and velocity. These variables are combined with basin characteristics for the sites, and multiple-regression techniques are used to select the best combination of variables to estimate the selected floods.

PB81-155061 PC **A14**/MF **A01**
Northern Cheyenne Research Project, Lame Deer, MT.
Hydrologic Impacts from Potential Coal Strip Mining - Northern Cheyenne Reservation. Volume I.
Final rept. Jun 75-Dec 79,
William W. Woessner, Thomas J. Osborne, Edward L. Heffern, Charles Andrews, and Jason Whiteman. Feb 81, 322p EPA-600/7-81-004A
Grant EPA-R-803566
See also Volume 2, PB81-161960.

This report presents the results of a large scale hydrologic study performed on the Northern Cheyenne Reservation. Data from surface water monitoring, groundwater monitoring, and geologic profiles is combined to estimate potential disruptions from future coal mine development on the reservation.

PB81-156135 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Ground Water Overdrafting Must Be Controlled.
Report to the Congress.
12 Sep 80, 62p CED-80-96

This report describes the numerous problems associated with ground water overdrafting in many areas of the Nation and discusses the need for the Federal Government to discourage continued uncontrolled overdrafting. GAO recommends that the Congress direct the Department of Agriculture, the

Army, and the Interior to require that affected States and communities implement or have plans to implement a program for controlling ground water pumping and a conservation program before the start of federally funded water resources or ground water mitigation projects.

PB81-803363 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sediment Transport in Rivers. 1978-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1978-Jan 81.
Feb 81, 83p
Supersedes PB80-803356, and NTIS/PS-78/1322. See also 1964-December, 1977, PB80-803349.

The bibliography cites research covering many aspects of river sediment transport: Sediment transport studies concerned in the stream erosion, scouring, particle size, water quality, flow rate, river mouth processes, and streambed degradation. Research dealing exclusively with lakes and reservoirs is excluded. (This updated bibliography contains 78 citations, 19 of which are new entries to the previous edition.)

RHO-BWI-C-61 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Well Location and Land-Use Mapping in the Columbia Plateau Area.
J. Stephan, H. Foote, and V. Coburn. Oct 79, 159p PNL-3295
Contract AC06-77RL01030

Irrigation wells in a 41,000-square mile area located in Washington and northern Oregon were the subject of this study. Approximately 30,000 square miles of the area were mapped within the boundary of the Columbia Plateau, which covers some 48,200 square miles in the states of Washington, Oregon, and Idaho. Advanced state-of-the-art computer analysis techniques for processing Landsat digital multispectral data were used for mapping the area into ten land-use classes. Specially designed computer programs were used for mapping the locations of 1476 irrigation wells located in 13 counties. Six thematic color-encoded maps were prepared which show additional land-use types and relative areal distribution. Three maps depict the location of irrigation wells. (ERA citation 06:005821)

RHO-BWI-ST-5 PC **A99**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Hydrologic Studies within the Columbia Plateau, Washington: An Integration of Current Knowledge.
R. E. Gephart, R. C. Arnett, R. G. Baca, L. S. Leonhart, and F. A. Spane, Jr. Oct 79, 1537p
Contract AC06-77RL01030

Hydrologic studies are one of the principal research activities within the Basalt Waste Isolation Project. The objective of these studies is to provide a clear evaluation of the hydrologic systems present within the Columbia River basalt significant to the possible siting of a waste repository. This is accomplished through an intense data gathering program in addition to conducting groundwater flow and solute transport modeling under both anticipated and credible hypothetical hydrologic scenarios. The hydrology effort is centered within the Pasco Basin located in south-central Washington State, particularly that portion of the basin within the Hanford Site. Regional hydrology studies for other portions of the Columbia Plateau are being carried out to assist in understanding the surface-water and groundwater flow systems existing within the Pasco Basin. The major questions being addressed in all of the above studies focus upon important repository considerations related to groundwater flow paths, groundwater velocities, and solute concentrations and travel times. This report summarizes the data obtained and interpretations made to date regarding the hydrology of the Pasco Basin. The text of this report is divided into four chapters. Chapter I describes the purpose and scope of the hydrology program. Chapter II discusses the regional studies. Chapter III discusses the Pasco Basin hydrology, and Chapter IV gives a status report of the numerical modeling activities. (ERA citation 06:005822)

USGS-OFR-80-569 PC **A05**/MF **A01**
Geological Survey, Reston, VA.
Paleohydrology of the Southern Great Basin, with Special Reference to Water Table Fluctuations Beneath the Nevada Test Site During the Late Pleistocene.
I. J. Winograd, and G. C. Doty. 1980, 98p
Contract AI08-78ET44802

The magnitude of water table rise during Pleistocene pluvial climates, and of the resultant shortening of ground-water flow path and reduction in unsaturated zone thickness, is investigated. The distribution of calcitic veins in alluvium and lakebeds, and of tufa deposits, between the Ash Meadows spring discharge area and the Nevada Test Site suggests that discharge from the regional Paleozoic carbonate aquifer during the Late Pleistocene occurred at distances as much as 14 kilometers northeast of Ash Meadows and at altitudes up to 50 meters higher than at present. Use of the underflow equation (relating discharge to transmissivity, aquifer width, and hydraulic gradient), and various assumptions regarding pluvial recharge, transmissivity, and altitude of ground-water base level, suggest possible rises in potentiometric level in the carbonate aquifer of 6 to 90 meters beneath central Frenchman Flat, 58 kilometers northeast of Ash Meadows. During Wisconsin time the rise probably did not exceed 30 meters. Water-level rises beneath Frenchman Flat during future pluvials are unlikely to exceed 30 meters, and future levels might even be 10 meters lower than the modern one, 210 meters beneath the center of the valley. Neither the cited rise in potentiometric level in the regional carbonate aquifer, nor the shortened flow path during the Late Pleistocene precludes utilization of the NTS as a repository for high-level or transuranic-element radioactive wastes provided other requisite conditions are met at this site. Deep water tables, attendant thick (up to several hundred meter) unsaturated zones, and ground-water flow paths tens of kilometers in length characterized the region during Wisconsin time and possibly throughout the Pleistocene, and are likely to so characterize it during future pluvial climates. (ERA citation 06:005493)

8I. Mining Engineering

DOE/ET/12463-1 PC **A05**/MF **A01**
Colorado School of Mines, Golden. Excavation Engineering and Earth Mechanics Inst.
Application of Water Jet Assisted Drag Bit and Pick Cutter for the Cutting of Coal Measure Rocks. Final Technical Report.
D. Ropchan, F. D. Wang, and J. Wolgamott. 1 Apr 80, 95p
Contract FG01-77ET12463

A laboratory investigation was made of the effects of high pressure water jets on the cutting forces of drag bit cutters in sedimentary rocks. A hard and soft sandstone, shale and limestone were tested with commercially obtainable conical and plow type drag bits on the EMI linear cutting machine. About 1200 cuts were made at different bit penetration, jet orientation, and water pressure to determine the reduction of cutting forces on the bit from the use of the water jet. Both independent and interactive cutting was used. The greatest reduction in cutting forces were with both of the sandstones; the drag forces were reduced about 30 percent and the normal forces about 60 percent at 5000 psi water pressure with the nozzle behind the bit. The method was less effective in the shale, except at 10,000 psi water pressure the reduction in drag force was about 55 percent. Of the rocks tested, the limestone was least affected by the water jet. The cutting forces for the plow bit showed continuous change with wear so a machined conical bit was used for most of the testing. Tests with the plow bit did show a large reduction in cutting forces by using the water jet with worn bits. An economic analysis of equipping a drag bit tunnel boring machine indicated that the water jet system could reduce costs per foot in sandstone by up to 40 percent. (ERA citation 06:005696)

DOE/ET/27111-1 PC **A09**/MF **A01**
Texas Univ. at Austin. Bureau of Economic Geology.
Factors Controlling Reservoir Quality in Tertiary Sandstones and Their Significance to Geopressured Geothermal Production. Annual Report, May 1, 1979-May 31, 1980.
R. G. Loucks, D. L. Richmann, and K. L. Milliken. Jul 80, 200p
Contract AC08-79ET27111

Differing extents of diagenetic modification is the factor primarily responsible for contrasting regional reservoir quality of Tertiary sandstones from the Upper and Lower Texas Gulf Coast. Detailed comparison of Frio sandstones from the Chocolate Bayou/Danbury Dome area, Brazoria County, and Vicksburg sandstones from the McAllen Ranch Field area, Hidalgo County, reveals that extent of diagenetic modification is most strongly influenced by (1) detrital mineralogy and (2) regional geothermal gradients. Vicksburg sandstones from the McAllen Ranch Field area are less stable, chemically and mechanically, than Frio sandstones from the Chocolate Bayou/Danbury dome area. Vicksburg sandstones are mineralogically immature and contain greater proportions of feldspars and rock fragments than do Frio sandstones. Thr reactive detrital assemblage of Vicksubrg sandstones is highly susceptible to diagenetic modification. Susceptibility is enhanced by higher than normal geothermal gradients in the McAllen Ranch Field area. Thus, consolidation of Vicksburg sandstones began at shallower depth of burial and precipitation of authigenic phases (especially calcite) was more pervasive than in Frio sandstones. Moreover, the late-stage episode of ferroan calcite precipitation that occluded most secondary porosity in Vicksburg sandstones did not occur significantly in Frio sandstones. Therefore, regional reservoir quality of Frio sandstones from Brazoria County is far better than that characterizing Vicksburg sandstones from Hidalgo County, especially at depths suitable for geopressured geothermal energy production. (ERA citation 06:005962)

DOE/ET/28392-T2 PC **A05**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Geology and Geophysics.
Management Assistance for the Development of Hydrothermal Energy in the Rocky Mountain/Basin and Range Region. Final Report, October 19, 1977-December 31, 1979.
J. R. Bowman, and R. L. Chapman, D. S. Bruhn. Sep 80, 100p
Contract AC07-ET28392

Abstracts of forty-six reports on this contract are presented. A comprehensive list of technical reports produced by geothermal sponsored by US DOE is included. (ERA citation 06:005956)

DOE/SF/11450-1 PC **A04**/MF **A01**
Stanford Univ., CA.
Geothermal Reservoir Engineering Computer Code Comparison and Validation Using the GEONZ Simulator Program.
R. N. Horne, D. O. Ogbe, K. Temeng, and H. J. Ramey, Jr. 14 Nov 80, 67p
Contract AC03-80SF11450

It was originally proposed to use the GEOTHERM geothermal simulator program to prepare solutions to the first five of the six Department of Energy computer code comparison sets. Valid solutions were anticipated in all of the five problems attempted, but it was expected that problems 3 and 4 might present some difficulties. A more recent version of the program, called GEONZ became available and was used successfully on problems 3 and 4. The new program, GEONZ, had additional capabilities that enabled it to handle both superheated steam and counterflows of steam and water. The choice of the GEONZ code is discussed, followed by an in-depth description of the solutions obtained for problems 1 through 5. The problem statements are included as Appendix A. The five problems are: 1-D Avdonin Solution, 1-D well test analysis, 2-D flow in fracture/block medium, 2-D phase system with drainage, and flow in a 2-D areal reservoir. (ERA citation 06:005986)

FE-2542-7 PC **A07**/MF **A01**
Continental Oil Co., Stamford, CT.
Pipeline Gas Demonstration Plant. Phase I: Preliminary Coal Mining Plan.
D. M. Wagner. 1978, 144p
Contract AC01-77ET13060

Continental Oil Company will, as contractor, analyze, design, construct, test, evaluate, and operate a Demonstration Plant capable of converting high-sulfur bituminous caking coal to a high-Btu pipeline quality gas. One of the assignments under the contract is to prepare a preliminary plan for mining a coal reserve adjacent to the tentatively selected site for the Demonstration Plant. This coal reserve is one potential source of the coal feed to the plant during Phase III operations of the plant as a commercial venture. A large reserve of surface-mineable Meigs Creek Ohio No. 9 coal is located within about three miles of the tentatively selected Demonstration Plant site in Noble County, Ohio. This reserve is owned by Consolidation Coal Company, and Consolidation Coal has expressed a willingness to enter into a long-term agreement to supply ROM coal to the Demonstration Plant. The coal would be mined using a combination of stripping dozers and walking dragline. Conventional mining practices would be followed. Both the mining procedures and reclamation of the areas affected by mining would be in conformance with Federal and state statutes and regulations. The mining plan requires producing 1,468,000 tons per year of ROM coal for a period of 25 years. The investment in mining equipment and mine development over this period is estimated to be $83,104,000. A total of 168 employees will be required for the mining operations. (ERA citation 06:005699)

GJBX-195(80) PC **E02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Spokane NTMS 1 exp 0 X 2 exp 0 Quadrangle Area, Washington-Idaho-Montana. Supplemental Data Report: National Uranium Resource Evaluation Program, Hydrogeochemical and Stream Sediment Reconnaissance.
J. R. Cook. 1980, 20p DPST-80-146-15S
Contract AC09-76SR00001
Includes 10 sheets of 48 reduction microfiche.

Supplemental analytical results for stram sediments, ground water, and surface water are presented. The samples were collected as part of the SRL-NURE reconnaissance in the National Topographic Map Series (NTMS) Spokane 1 exp 0 x 2 exp 0 quadrangle. Results are reported for 23 elements (Ag, As, Ba, Be, Ca, Co, Cr, Cu, K, Li, Mg, Mo, Nb, Ni, P, Pb, Se, Sn, Sr, W, Y, Zn, and extractable U) in sediments and 31 elements (Ag, Al, As, B, Ba, Be, Ca, Ce, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Sc, Se, Si, Sr, Th, Ti, V, Y, Zn, and Zr) in waters. Field data and Neutron Activation Analyses for uranium and 16 other elements in sediments and for uranium and nine other elements in water have been open-filed in SRL document DPST-80-146-15. (ERA citation 06:005776)

GJBX-246(80) PC **A03**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
FACEDT: A FORTRAN Computer Program to Process Hydrogeochemical and Stream-Sediment Reconnaissance Data for Multivariate Statistical Analysis.
D. L. Shettel, Jr., R. F. D'Andrea, Jr., and R. J. Zinkl. Mar 80, 30p
Contract AC13-76GJ01664

The FACEDT program compresses a rectangular N (unlimited number of samples) by M (maximum of 100 variables) array of geochemical data by eliminating missing analyses and elements containing excessive data below detection limit. This compressed clean matrix is then suitable for input to multivariate statistical programs, such as those used to perform principal component, step-wise multiple regression, and discriminant analyses. (ERA citation 06:005785)

GJBX-247(80) PC **A03**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
LLLSRT: A FORTRAN Computer Program for Processing Lawrence Livermore Laboratory HSSR Data.
D. L. Shettel, Jr., R. F. D'Andrea, Jr., and R. J. Zinkl. Feb 80, 44p
Contract AC13-76GJ01664

A FORTRAN computer program is presented that will read, edit, and sort hydrogeochemical and stream-sediment reconnaissance (HSSR) data produced by the Lawrence Livermore Laboratory for the National Uranium Resource Evaluation program. The data are sorted into dry stream-, wet stream-, and lake/reservoir-sediment samples and into ground water, surface water, and lake/reservoir water samples. Extraneous information is eliminated, and missing analyses are assigned a specific value. The error on each elemental analysis is used to check for below-detection-limit data. Output from the program occupies less than half the space of the original tape, reducing storage costs. (ERA citation 06:005786)

GJBX-248(80) PC **A05**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
FORTRAN Computer Programs to Process Savannah River Laboratory Hydrogeochemical and Stream-Sediment Reconnaissance Data.
R. J. Zinkl, D. L. Shettel, Jr., and R. F. D'Andrea, Jr. Mar 80, 90p
Contract AC13-76GJ01664

FORTRAN computer programs have been written to read, edit, and reformat the hydrogeochemical and stream-sediment reconnaissance data produced by Savannah River Laboratory for the National Uranium Resource Evaluation program. The data are presorted by Savannah River Laboratory into stream sediment, ground water, and stream water for each 1 exp 0 x 2 exp 0 quadrangle. Extraneous information is eliminated, and missing analyses are assigned a specific value (-99999.0). Negative analyses are below the detection limit; the absolute value of a negative analysis is assumed to be the detection limit. (ERA citation 06:005787)

GJBX-251(80) PC **E09**/MF**$7.00**
INCO, Inc., McLean, VA.
Aerial Radiometric and Magnetic Survey: Woodward National Topographic Map, Oklahoma, West Texas Project.
May 80, 116p
Contract AC13-76GJ-01664
Includes 36 sheets of 24 reduction microfiche.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Woodward National Topographic Map NJ14-11 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 06:005788)

GJBX-254(80)(V.1) PC **A06**/MF **A01**
IRT Corp., San Diego, CA.
Exp 252 Cf-Based Direct Uranium Logging System. Volume 1. Final Report.
D. K. Steinman, J. Stokes, J. A. Adams, C. S. Pepper, and D. E. Bryan. Jan 80, 122p IRT-0053-016-1(V.1)
Contract AC13-76GJ01664

To reduce both the uncertainties and costs of current methods, a exp 252 Cf-based borehole logging system was developed for in situ assay of uranium. This system utilized Delayed Neutron Activation Analysis (DNAA) to identify uniquely and to quantify a uranium occurrence. Thermal neutrons emitted by the exp 252 Cf system penetrate 15 cm into the surrounding formation and, if uranium is present, will cause fission of exp 235 U. The resulting fission products emit various characteristic types of radiation, including delayed neutrons. Since the background interference from natural neutron sources is essentially zero, the delayed neutrons are used to identify and quantify uranium even at concentrations significantly less than 100 ppM. This uranium borehole logging system was demonstrated successfully in the field in 1976. The system was a prototype based on the shuttling of the exp 252 Cf source between two locations in the logging probe. This method produces a large increase in sensitivity over the stationary source exp 252 Cf DNAA probe. (ERA citation 06:005790)

GJBX-255(80) PC **E02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Boston 1 exp 0 X 2 exp 0 NTMS Area, Massachusetts, and New Hampshire. Data Report (Abbreviated): National Uranium Resource Evaluation Program, Hydrogeochemical and Stream Sediment Reconnaissance.
J. R. Cook. 1980, 19p DPST-80-146-19
Contract AC09-76SR00001
Includes 7 sheets of 48 reduction microfiche.

Results of ground water and stream sediment reconnaissance in the National Topographic Map Series (NTMS) Boston 1 exp 0 x 2 exp 0 quadrangle are presented. Surface sediment samples were collected at 669 sites. Ground water samples were collected at 303 sites. Neutron activation analysis (NAA) results are given for uranium and 16 other elements in sediments, and for uranium and 8 other elements in ground water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented. Data from ground water sites include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) physical measurements where applicable (water temperature, well description, etc.), and (3) elemental analyses (U, Al, Br, Cl, Dy, F, Mn, Na, and V). Data from sediment sites include (1) stream water chemistry measurements (pH, conductivity, and alkalinity), and (2) elemental analyses for sediment samples (U, Th, Hf, Al, Ce, Dy, Eu, Fe, La, Lu, Mn, Sc, Sm, Na, Ti, V, and Yb). Sample site descriptors (stream characteristics, vegetation, etc.) are also tabulated. Areal distribution maps, histograms, and cumulative frequency plots for most elements and for U/Th and U/Hf ratios are included on the microfiche. Key data from stream water sites include (1) water quality measurements (pH, conductivity, and alkalinity) and (2) elemental analyses (U, Al, Br, Cl, Dy, F, Mg, Mn, Na, and V). The maximum uranium concentration in the sediments of the Boston quadrangle was 82.1 ppM. The mean of the logarithms of the uranium concentrations in sediments was 0.68, which corresponds to 4.8 ppM uranium. A cluster of samples with uranium values greater than 40 ppM and which have low thorium concentrations occurs in Essex County, Massachusetts. (ERA citation 06:005791)

GJQ-004(80) PC **A05**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
National Uranium Resource Evaluation: Spartanburg Quadrangle, South Carolina and North Carolina.
E. H. Schot, and J. M. Galipeau. Nov 80, 84p
Contract AC13-76GJ01664

The Spartanburg Quadrangle, South Carolina and North Carolina, was evaluated for uranium favorability using National Uranium Resource Evaluation criteria. The evaluation included the study and analysis of published and collected geologic, geophysical, and geochemical data from subsurface, surface, and aerial studies. Five environments are favorable for uranium deposits. The Triassic Wadesboro Basin has ground waters with anomalously high uranium concentrations and uranium-to-conductivity ratios. The Upper Cretaceous Tuscaloosa-Middendorf Formation is near a uranium source and has sediments favorable for uranium deposition. The contact-metamorphic aureoles associated with the Liberty Hill-Kershaw and Winnsboro-Rion plutonic complexes are close to uranium sources and contain the reductants (sulfides, graphite) necessary for precipitation. The East Fork area in the Charlotte Belt has ground waters with uranium concentrations 4 to 132 times the mean concentration reported for the surrounding Piedmont area. Unfavorable environments include the Catawba Granite, the area west of the Winnsboro-Rion complex, gold-quartz veins, the vermiculite district, and the Western Monazite Belt. (ERA citation 06:005792)

LA-8314-PR PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Remote Characterization of Fluid Saturation in Western Sands. Progress Report, April 1, 1979-March 31, 1980.
E. B. Nuckols, and J. A. Jackson. Dec 80, 58p
Contract W-7405-ENG-36

The Department of Energy has placed major emphasis on enhanced gas production, of which the Western Gas Sands (WGS) is one of four unconventional resources that is being studied. Research at the Los Alamos Scientific Laboratory is aimed at the development of methods to define fluid saturation, porosity, and permeability in WGS as found under in situ reservoir conditions. These analyses are being coordinated with nuclear magnetic resonance (NMR) studies, which will lead ultimately to the design of an improved downhole NMR tool. (ERA citation 06:005765)

LBL-10140 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Geothermal Exploration Assessment and Interpretation, Upper Klamah Lake Area, Klamath Basin, Oregon.
M. Stark, N. E. Goldstein, and H. A. Wollenberg. Sep 80, 89p
Contract W-7405-ENG-48

Data from public and private sources on the Klamath Basin geothermal resource are reviewed, synthesized, and reinterpreted. In this, the second and final phase of the work, geological, remote sensing, geochemical, temperature gradient, gravity, aeromagnetic, and electrical resistivity data sets are examined. These data were derived from surveys concentrated on the east and west shores of Upper Klamath Lake. The geological, remote sensing, and potential field data suggest a few northeast-trending discontinuities, which cross the regional north-westerly strike. The near-surface distribution of warm water appears to be related to the intersections of these lineaments and northwest-trending faults. The groundwater geochemical data are reviewed and the various reservoir temperature estimates compared. Particular attention is given to specific electrical conductivities of waters as an interpretational aid to the subsurface resistivity results. A clear trend emerges in the Klamath Falls/Olene Gap area; hotter waters are associated with higher specific conductivities. In the Nuss Lake/Stukel Mountain area the opposite trend prevails, although the relationship is somewhat equivocal. (ERA citation 06:004713)

LBL-10656 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Preliminary Estimation of the Reservoir Capacity and the Longevity of the Baca Geothermal Field, New Mexico.
G. S. Bodvarsson, S. Vonder Haar, M. Wilt, and C. F. Tsang. Jul 80, 21p CONF-800931-4
Contract W-7405-ENG-48
55. Society of Petroleum Engineers of AIME annual technical conference and exhibition, Dallas, TX, USA, 21 Sep 1980.

A 50 MW geothermal power plant is currently under development at the Baca site in the Valles Caldera, New Mexico, as a joint venture of the Department of Energy (DOE), Union Oil Company of California, and the Public Service Company of New Mexico (PNM). To date, over 20 wells have been drilled on the prospect, and the data from these wells indicate the presence of a high-temperature liquid dominated reservoir. Data from open literature on the field are used to estimate the amount of hot water in place (reservoir capacity) and the length of time the reservoir can supply steam for a 50 MW power plant (reservoir longevity). The reservoir capacity is estimated by volumetric calculations using existing geological, geophysical, and well data. The criteria used are described and the sensitivity of the results discussed. The longevity of the field is studied using a two-phase numerical simulator (SHAFT79). A number of cases are studied based upon different boundary conditions, and injection and production criteria. Constant or variable mass production is employed in the simulations with closed, semi-infinite or infinite reservoir boundaries. In one of the cases, a fault zone feeding the production region is modeled. The injection strategy depends on the available waste water. The results of these simulations are discussed and the sensitivity of the results, with respect to mesh size and the relative permeability curves used, are briefly studied. (ERA citation 06:005987)

PATENT-4 219 237
Not available NTIS
Department of Energy, Washington, DC.
Method for Maximizing Shale Oil Recovery from an Underground Formation.
Patent,
C. J. Sisemore. Filed 30 Sep 77, patented 26 Aug 80, 5p PAT-APPL-838 274
Supersedes PAT-APPL-838 274-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for maximizing shale oil recovery from an underground oil shale formation which has previously been processed by in situ retorting such that there is provided in the formation a column of substantially intact oil shale intervening between adjacent spent retorts, which method includes the steps of back filling the spent retorts with an aqueous slurry of spent shale. The slurry is permitted to harden into a cement-like substance which stabilizes the spent retorts. Shale oil is then recovered from the intervening column of intact oil shale by retorting the column in situ, the stabilized spent retorts providing support for the newly developed retorts. (ERA citation 06:006959)

PB81-146813 PC **A02**/MF **A01**
Utah Geophysical, Inc., Salt Lake City.
Feasibility Study for a Seismic Drill Bit Location and Guidance System.
Lewis J. Katz. 1980, 25p NSF/RA-800055
Grant NSF-DAR79-17035

The feasibility of seismically monitoring a rotary drill bit as a means of continuously tracking the location of the bit as it drills into the earth was investigated. A beamsteering array processing technique was used to locate the drill bit. Recorded data is analyzed in a manner similar to that used to locate earthquakes. Results demonstrate that the drill bit generates a unique coherent signal which can be used to locate the bit in the ground. Comparison of results to a conventional method confirms the deviation angle detemined by the new seismic method. This method also supplies azimuthal direction. Benefits to be derived from this study are a reduction in drilling costs for deep wells and a method of providing the driller with information that is needed to reach a traget at depth.

PB81-146888 PC **A04**/MF **A01**
Liquid Chemical Co., Inc., Hanford, CA.
Selective Membrane Separation of Fine Solids.
Final rept.,
David M. Kawano. Mar 80, 60p NSF/RA-800319
Grant NSF-DAR79-17099

Many potentially valuable minerals are now discarded as 'slimes' or fine mixtures because they are too difficult to separate or process. Only a limited number of processing methods are potentially available for these materials, and their generally poor economics have limited their commercial application. To assist with this problem, a study was done to see if large-pore membranes could be used in an electrodialysis-type cell to allow selectively charged particles (natural or resulting from an additive) to be separated from a fine-ore slurry. The possible upgrading of phosphate slimes and impure clay in specially constructed electrodialysis cells was examined. The concept was partially successful in that a definite separation between some of the particles did occur. Ion exchange membranes with about about a 40 micrometers pore size were the most effective, but in these limited tests sufficient optimization of the variables could not be developed to result in an economically practical separation method.

PB81-147126 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Face Ventilation Measurement with Sulfur Hexafluoride (SF6).
Rept. of investigations/1980,
Robert P. Vinson, Fred N. Kissell, John C. LaScola, and Edward D. Thimons. 1980, 21p BUMINES-RI-8473

The face ventilation measurement method developed by the Bureau of Mines involves releasing a small volume of tracer gas (SF6) on the off-curtain side of the working face at the start of the mining cycle. At the same time, gas bottle samples are taken in the immediate return airway. The gas samples are analyzed, and a curve is drawn of SF6 concentration versus time. From this curve, the percentage of gas removed per time is calculated. A curve showing a high percentage of the tracer gas removed in a short period would represent a well-ventilated face. The face ventilation measurement method was tested in a full-scale mine entry model. Subsequently it was used underground to evaluate the spray-fan ventilation system and in an MSHA test facility to test machine-mounted scrubbers. The method was shown to be a simple and effective way of evaluating face ventilation systems.

PB81-147266 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Reinforcement Mechanisms of Untensioned Full-Column Resin Bolts.
Rept. of investigations/1980,
August J. Kwitowski, and Lewis V. Wade. 1980, 43p BUMINES-RI-8439

This Bureau of Mines report describes how the reinforcement mechanisms of untensioned, full-column resin bolts were determined during one underground study. Both axial and transverse shear loadings were identified for two instrumented resin bolts that replaced standard resin bolts in an operating room-and-pillar mining section. The strain responses of resin bolt steel cores to local axial and transverse shear loadings are described. This information was obtained from laboratory testing of resin bolts installations; it was also used to analyze the data from the underground test.

PB81-147316 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Three Coal Mine Gob Degasification Studies Using Surface Boreholes and a Bleeder System.
Rept. of investigations/1980,
S. D. Maksimovic, and Fred N. Kissell. 1980, 15p BUMINES-RI-8459

The use of vertical surface degasification boreholes with bleeder systems and the use of a timbered bleeder system to degasify gob areas were studied by the Bureau of Mines. This report describes three gob degasification studies conducted in the Pittsburgh coalbed. One study was conducted to determine the number of panels degasified with one large borehole. The study showed that the borehole provided degasification for three panels. Another study was conducted during the retreat of a 35-acre panel with a single-entry and a two-entry bleeder system and a large surface borehole. A major portion of methane emitted from the panel was carried away by the borehole, leaving the bleeder entries relatively free of methane. The last study was made to determine the effectiveness of a timbered bleeder system. The bleeder entries successfully degasified the gob area when enough entries were available and adequate pressure was available to force the air through roof falls.

PB81-147381 PC **A02**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Partial Pressures of Gaseous HCl and H2O Over Aqueous Solutions of HCl, AlCl3, and FeCl3.
Rept. of investigations/1980,
N. A. Gokcen. 1980, 24p BUMINES-RI-8456

Equilibrium partial pressures of gaseous HCl and H2O over aqueous binary and ternary solutions of HCl and AlCl3 were calculated or estimated in the range of 20 to 110 C, and up to saturation with AlCl3.6H2O. The results were extended to solutions containing less than 10 wt-pct FeCl3 by assuming that FeCl3 and AlCl3 are equivalent on the molar basis, since both salts have trivalent cations with a common anion. The ionic activity coefficient of HCl and the equilibrium constant for dissolution of gaseous HCl were also computed. This research is part of the effort by the Bureau of Mines,

U.S. Department of the Interior, to provide thermodynamic data to expand the technology base relevant to the extraction of alumina from nonbauxitic domestic raw materials.

PB81-148090 PC **A03**/MF **A01**
National Science Foundation, Washington, DC. Div. of Problem Focused Research.
Deep Mineral Resources, Current Research Projects Supported by the Integrated Basis Research Program,
Jack T. Sanderson, Donald Senich, Lewis G. Mayfield, and Ritchie B. Coryell. Mar 80, 34p NSF/RA-800327

The status of basic research projects dealing with the origins of ore deposits, mineral exploration, and extraction of mineral values by in situ leaching (solution mining), is summarized. Interest in this new technology is spurred by the exhaustion of shallow deposits of high grade ore and the costly, high-energy methods of mining and processing low grade ores. Deep mineral deposits increase in importance as future mineral supplies, provided that science and technology can be developed to exploit them. Mining by in situ methods is a promising alternative means of mineral extraction which offers a significant improvement in miner safety and reduced disturbance of the surface environment. These methods involve injecting leaching solutions into a deep ore body where they react chemically with minerals. Dissolved minerals then flow to the surface via production wells where the metals are recovered by hydrometallurgical processes. Projects reported include solution mining--solution chemistry and rock mechanics--and mineral exploration science--geodynamics, metallogenesis, deep basement and upper mantle investigations, and exploration methods.

PB81-148173 PC **A03**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Research Center.
Recovery of Potash Feldspar from Molybdenite Tailings.
Rept. of investigations/1980,
W. H. Eddy, and G. V. Sullivan. 1980, 29p BUMINES-RI-8475

The Bureau of Mines used several laboratory batch flotation schemes combined with magnetic separation to investigate the feasibility of recovering potash feldspar and glass sands from molybdenite tailings. Four molybdenite tailings or prospective tailings were used as test samples. Feldspar concentrates containing from 10.7 pct to 12.0 pct K2O were recovered from three of the four samples. The alkali content of the fourth sample met the grade for a mixed feldspar. All the feldspar concentrates contained iron in excess of the 0.10-pct-Fe2O3 specification for most uses. Electron-beam microprobe examination of the feldspar concentrates showed the presence of an iron-bearing potash feldspar in quantities that were excessive with respect to most iron specifications. However, a high-quality glass sand was produced from all of the samples.

PB81-148181 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Review of Horizontal Drilling Technology for Methane Drainage from U.S. Coalbeds.
Information circular/1980,
Gerald L. Finfinger, and Joseph Cervik. 1980, 26p BUMINES-IC-8829

This Bureau of Mines publication reviews underground methane drainage programs being conducted in various coalbeds. Equipment used in drainage programs such as drills, underground pipelines, and methane monitoring systems is described.

PB81-148199 PC **A03**/MF **A01**
Bureau of Mines, Spokane, WA. Spokane Research Center.
Shaft Design in the Coeur d'Alene Mining District, Idaho-Results of in situ Stress and Physical Property Measurements.
Rept. of investigations/1980,
Michael J. Beus, and Samuel S. M. Chan. 1980, 46p BUMINES-RI-8435

This Bureau of Mines report describes field investigations conducted in the Coeur d'Alene mining district of Idaho to obtain data on rock stress and physical properties. The resulting information has been utilized as input to detailed finite-element analyses to establish structural design criteria for deep-vein mine shafts. Measurement techniques include the Council for Scientific and Industrial Research biaxial and triaxial strain cells, the U.S. Geological Survey solid-inclusion probe, and the Colorado School of Mines dilatometer. Physical property testing was conducted in the laboratory on core obtained from each test site. Limited in situ physical property tests were also conducted. Reasonable success was obtained with the CSIR equipment, which was considered the most suitable for stress measurement in the study area. Test sites ranged in depth from 1,200 to 7,700 feet and are described in detail. The stress data were reduced by least-squares linear regression techniques to enable prediction of vertical and horizontal stresses to 7,500 feet. Ratios between the horizontal stresses as utilized for shaft design varied considerably, and a hydrostatic condition is the exception, based on Bureau measurements. Physical properties also varied widely, due to the complex geologic structure. Analyses of the data in terms of the tectonic history of the area show reasonable correlation. Data from previous rock mechanics investigations from the Coeur d'Alene district were also compiled and presented as part of this report to justify any generalizations regarding stress conditions and physical properties of the district as a whole.

PB81-148264 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Guide to Substation Grounding and Bonding for Mine Power Systems.
Information circular/1980,
Wils L. Cooley, and Roger L. King. 1980, 34p BUMINES-IC-8835

The objective of this guide is to provide specific engineering information to the mining industry. Using as little theory as possible, it was written to be general enough to cover most substations, but specific enough to provide direct help with each substation. It will attempt to recommend practice that is in agreement with present Federal rules and regulations.

PB81-148371 PC **A03**/MF **A01**
Bureau of Mines, Twin Cities, MN. Twin Cities Research Center.
A Statistical Analysis of Coal Mine Fire Incidents in the United States from 1950 to 1977.
Information circular/1980,
L. Bruce McDonald, and William H. Pomroy. 1980, 50p BUMINES-IC-8830

This Federal Bureau of Mines publication is a statistical analysis of all surface and underground coal mine fires reported in the United States from 1950 to 1977. Accounts of selected nonreportable fires and opinion data gathered via interviews with mine safety directors were separately analyzed. Both reported and nonreportable fires were analyzed by time trends, State, ignition source, burning substance, location in mine, equipment, detection, duration, injuries, fatalities, and successful extinguishing agents. It was found that the majority of all mine fires were electrical in origin. The equipment most frequently involved in underground fires was conveyor belts, and in surface fires, it was crushers and/or breakers. Underground fires occurred most often near the working face. Water and hand-portable extinguishers were the most common methods of extinguishment.

PB81-148918 PC **A06**/MF **A01**
Bureau of Mines, Twin Cities, MN. Twin Cities Research Center.
Structure Response and Damage Produced by Airblast from Surface Mining.
Rept. of investigations/1980,
David E. Siskind, Virgil J. Stachura, Mark S. Stagg, and John W. Kopp. 1980, 121p BUMINES-RI-8485
Errata sheet inserted.

The Bureau of Mines studied airblast from surface mining to assess its damage and annoyance potential, and to determine safe levels and appropriate measurement techniques. Research results obtained from direct measurements of airblast-produced structure responses, damage, and analysis of instrument characteristics were combined with studies of sonic booms and human response to transient overpressures. Safe levels of airblast were found to be 134 dBL (0.1 Hz), 133 DBL (2 Hz), 129 dBL (6Hz), and 105 dB C-slow. These four airblast levels and measurement methods are equivalent in terms of structure response, and any one could be used as a safe-level criterion. Of the four methods, only the 0.1-Hz high-pass linear method accurately measures the total airblast energy present; however, the other three were found to adequately quantify the structure response and also represent techniques that are readily available to industry. Where a single airblast measuring system must be used, the 2-Hz linear peak response is the best overall compromise. The human response and annoyance problem from airblast is probably caused primarily by wall rattling and the resulting secondary noises. Although these will not entirely be precluded by the recommended levels, they are low enough to preclude damage to residential structures and any possible human injury over the long term.

PB81-150005 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Pneumatic Concentration of Mica.
Rept. of investigations/1980,
C. E. Jordan, G. V. Sullivan, and B. E. Davis. 1980, 31p BUMINES-RI-8457

The Bureau of Mines is conducting research into the pneumatic recovery of coarse mica and has used this method to produce mica concentrates that contain more than 90 percent mica. Researchers used a Bureau-designed system of crushers, screens, and zigzag air classifiers to concentrate coarse liberated mica particles from mica-bearing materials. This pneumatic system was used to concentrate four mica ores from Arizona, North Carolina, and South Dakota and three waste tailings from Alabama, Georgia, and South Dakota.

PB81-150039 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Spontaneous Combustion Susceptibility of U.S. Coals.
Rept. of investigations/1980,
J. M. Kuchta, V. R. Rowe, and D. S. Burgess. 1980, 44p BUMINES-RI-8474

The chemical and thermal criteria used for predicting the spontaneous combustion hazard are briefly reviewed and data are presented to characterize the gas desorptions and self-heating tendencies of 29 U.S. coals. Closed vessel desorption experiments showed that CO, CO2, and CH4 are the main gases evolved and that the CO, CO/delta O2 index, and O2 absorption rate increase with decreasing rank and increasing oxygen content of the coal. In this Bureau of Mines report, the effects of temperature, moisture, and other variables are discussed together with the application of the data to the complex conditions encountered in a mining environment. An important finding is that the presence of CO alone in a mine is not necessarily an indication of a self-heating reaction of the coal. Based upon experiments conducted in an adiabatic-type calorimeter, the self-heating temperatures of lignite and subbituminous coals can be as low as 30C, whereas the bituminous coals require a temperature of about 60C or more. The self-heating hazard is greatest when the coals are dried and exposed to a high humidity condition, apparently as a result of the 'heat-of-wetting.' Generally, the hazard is greatest with the western coals of the United States.

PB81-150047 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
The Theory of Flammability Limits. Conductive-Convective Wall Losses and Thermal Quenching.
Rept. of investigations/1980,
Martin Hertzberg. 1980, 33p BUMINES-RI-8469

The concept of limit burning velocities, formulated in an earlier Bureau of Mines report (RI 8127) is applied to the problem of flame propagation through tubes of finite size. The limit burning velocity for conductive-convective wall-loss quenching

is determined mainly bh the ratio of contact-perimeter loss area to flame-zone cross-sectional area. This ratio of loss area to propagation area relates to the shape of the flame front and its control by buoyance and by boundary conditions. The comparison of (Su)b with previously defined limit velocities for systems mixed by natural convection allows one to assess the influence of tube dimensions and boundary constraints on the 'true' or earthly limits for the three directions of propagation. The flame quenching caused by inert powders is shown to be similarly described in terms of a limit burning velocity, (Su)'b. The tube's surface-to-volume ratio (approximately l/ro) is simply replaced by the powder's surface area per unit volume of the flammable mixture. Thermal loss quenching by these 'internal walls' occurs at a critical Peclet constant somewhat higher than that observed for tubes, and the problem is complicated by the finite heat capacities of the powders and particle lag effects in the flame front.

PB81-150088 PC **A04**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Behavior of Wood Fires in Model Tunnels Under Forced Ventilation Flow. Tests with Untreated Wood.
Rept. of investigations/1980,
C. K. Lee, R. F. Chaiken, J. M. Singer, and M. E. Harris. 1980, 66p BUMINES-RI-8450

This Bureau of Mines report presents results from experimental studies on wood fires in a laboratory-scale tunnel network. Experimental measurements include ignition delay time, flame spread rate, ventilation air and gas flow rates, wood temperature, gas temperature, pressure and composition, thermal flux, and smoke particulates. These measurements form a data base for fire-scaling studies and provide information on various fire processes, such as flow interacting between ventilation air and fire, fire throttling and reverse flow, and duct fire energetics. Results show how hazards of duct fires relate to the development of (1) asphyxiating and toxic fumes, (2) explosive gas mixtures, (3) throttling of ventilation air, and (4) high-temperature combustion products. Such fire hazards should be carefully considered when testing flammabilities of materials used in a confined underground mine environment.

PB81-153892 PC **A06**/MF **A01**
Bureau of Mines, Washington, DC.
Bureau of Mines Research 1979. A Summary of Significant Results in Mining, Metallurgy, and Mineral Economics.
1980, 120p BUMINES-SP-2-80
See also PB-299 723.

No abstract available.

PB81-803405 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Strip Mining. 1976-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1976-Jan 81.
Feb 81, 362p
Supersedes PB80-803570, and NTIS/PS-78/1164. See also 1964-1975, NTIS/PS-77/0950.

Abstracts primarily pertaining to environmental impacts, land reclamation, and satellite remote sensing of mines are cited from Federally-funded research. A few abstracts deal with mining equipment, legal factors, economics, and safety aspects of strip mining. (This updated bibliography contains 357 citations, 109 of which are new entries to the previous edition.)

PB81-803413 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Surface Mining: Strip Mining. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 149p
Supersedes PB80-803588, and NTIS/PS-78/1165.

Equipment and methods used in overburden removal and mining are the primary topics cited from worldwide research. A few abstracts pertain to rock mechanics, environmental impacts, reclamation procedures and costs, and the interaction of energy, economics, and reclamation. (This updated bibliography contains 144 citations, 7 of which are new entries to the previous edition.)

PB81-803421 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Surface Mining: Open Pit Ore Mining. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 233p
Supersedes PB80-803596, and NTIS/PS-78/1166.

Drilling and blasting practices, developments in mining machinery, slope stability research, and the use of computers to solve geological and mining problems are discussed in these citations from worldwide research. A few abstracts cover the economics of ore mining, surface transportation systems, and estimates of ore reserves. (This updated bibliography contains 228 citations, 52 of which are new entries to the previous edition.)

PB81-803439 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Surface Mining: Quarrying and General Studies. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 260p
Supersedes PB80-803604, and NTIS/PS-78/1167.

Worldwide research dealing primarily with methods, equipment, and explosives used in drilling, blasting, and open pit mining is cited. Topic areas cover air blast and ground vibration, open pit equipment selection and maintenance, slope stability, and optimization of open pit mining using computerized simulation techniques. (This updated bibliography contains 255 citations, 36 of which are new entries to the previous edition.)

PB81-914700 Subscription
Department of Energy, Oak Ridge, TN. Technical Information Center.
Geothermal Energy Update.
Monthly repts.
1981, 13 issues
Paper copy or microfiche available on subscription, North American Continent price $45.00/year; single copy price PC$6.00, MF$6.00; all others write for quote. Subscription includes Cumulative Index.

Contents: Geothermal energy (general); Resource status and assessment; Geology, hydrology, and geothermal systems; Geothermal exploration and exploration technology; Legal and institutional aspects; Economic and financial aspects; Environmental aspects; By-products; Geothermal power plants; Geothermal engineering; Direct energy utilization.

PNL-3478 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Validation Status of the VARGOW Oil Reservoir Model.
D. W. Mayer, E. M. Arnold, W. M. Bowen, and P. J. Gutknecht. Oct 80, 99p
Contract AC06-76RL01830

VARGOW, a variable gas-oil-water reservoir model, provides recovery estimates suitable for assessing various reservoir production policies and regulations. Data were collected for a number of reservoirs. From this data base, three reservoirs approximating the model assumptions were selected for model testing purposes. For all three reservoirs, it has been possible to simulate the observed pressures in both interpolative and extrapolative modes. Simulating the gas/oil ratio (GOR) has not been as successful, however. The VARGOW model will predict physically unrealistic results if the reservoir being simulated is not initially at the bubble point pressure of the reservoir fluid. If the discovery pressure is slightly above the bubble point, adjustments to initial conditions can be made using a method that has been outlined in this report. If the discovery pressure is considerably above the bubble point, it is recommended that an undersaturated reservoir model be employed until the bubble point is reached. For simulating reservoirs whose discovery pressure is below the bubble point, the VARGOW model must be modified. (ERA citation 06:005736)

UCRL-15302 PC **A19**/MF **A01**
Oregon Graduate Center, Beaverton.
Oregon Geothermal Environmental Overview Study.
J. A. Cooper. 30 Aug 80, 428p
Contract W-7405-ENG-48

A separate abstract was prepared for each of the six sections. (ERA citation 06:005979)

UCRL-83122(Rev.2) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Processing of High Salinity Brines for Subsurface Injection.
E. Raber, and R. E. Thompson. 10 Nov 80, 16p
CONF-800102-4(Rev.2)
Contract W-7405-ENG-48
International conference on geotechnical and environmental aspects of geopressure energy, Sea Island, GA, USA, 13 Jan 1980.

The methodology employed to evaluate the injectability of a fluid is presented. Test objectives, procedures, and results from field tests evaluating different chemical pretreatments and filtration methods for improving the injectability of high salinity brines are described. (ERA citation 06:005984)

USGS-CIRC-790 PC **A10**/MF **A01**
Geological Survey, Reston, VA. Geologic Div.
Assessment of Geothermal Resources of the United States, 1978.
L. J. P. Muffler. 1979, 216p
Contract AI01-77ET28383

The geothermal resource assessment presented is a refinement and updating of USGS Circular 726. Nonproprietary information available in June 1978 is used to assess geothermal energy in the ground and, when possible, to evaluate the fraction that might be recovered at the surface. Five categories of geothermal energy are discussed: conduction-dominated regimes, igneous-related geothermal systems, high-temperature (> 150 exp 0 C) and intermediate-temperature (90 to 150 exp 0 C) hydrothermal convection systems, low-temperature (< 90 exp 0 C) geothermal waters, and geopressured-geothermal energy (both thermal energy and energy from dissolved methane). Assessment data are presented on three colored maps prepared in cooperation with the National Oceanic and Atmospheric Administration. Separate abstracts were prepared for papers on these five categories. (ERA citation 06:003647)

8J. Physical Oceanography

AD-A093 469/5 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Comparison of Velocity-Depth Characteristics in Western North Atlantic and Norwegian Sea Sediments.
Journal article,
R. E. Houtz. 12 Feb 80, 7p Rept no. LDGO-3042
Contract N00014-75-C-0210
Pub. in Jnl. of the Acoustical Society of America, v68 n5 p1409-1414 Nov 80.

No abstract available.

AD-A093 471/1 PC **A03**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
The Chemistry, Biology, and Vertical Flux of Particulate Matter from the Upper 1500 m of the Panama Basin.
James K. B. Bishop, Robert W. Collier, Darlene R. Kettens, and John M. Edmond. 23 Nov 79, 30p Rept no. LDGO-2993

Contract N00014-75-C-0210
Pub. in Deep-Sea Research, v27A p615-640 1980. Prepared in cooperation with Massachusetts Inst. of Tech.

No abstract available.

AD-A093 550/2 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
Radiative Sensing of Sea Surface Temperature.
Technical rept.
Kristina B. Katsaros. 1980, 25p Rept no. CONTRIB-450
Contract N00014-75-C-0502
Pub. in Air-Sea Interaction, p293-317 1980.

No abstract available.

AD-A093 664/1 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Acoustic Environment of the Hatteras and Nares Abyssal Plains, Western North Atlantic Ocean, Determined from Velocities and Physical Properties of Sediment Cores.
Journal article,
Brian E. Tucholke. 12 Feb 80, 16p Rept no. LDGO-3048
Contract N00014-75-C-0210
Pub. in Jnl. of Acoustical Society of America, v68 n5 p1376-1390 Nov 80. Prepared in cooperation with Woods Hole Oceanographic Institution, MA. Rept. no. WHOI-CONTRIB-4547, Contract N00014-79-C-0071.

No abstract available.

AD-A093 666/6 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
The Hydrophone-Pinger Experiment.
Journal article,
George M. Bryan. 13 Feb 80, 7p Rept no. LDGO-3043
Contract N00014-75-C-0210
Pub. in Jnl. of Acoustical Society of America, v68 n5 p1403-1408 Nov 80.

No abstract available.

AD-A093 667/4 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Photographic Analysis of Coring.
Journal article,
Floyd W. McCoy. 25 Apr 80, 22p Rept no. LDGO-3020
Contract N00014-75-C-0210, Grant NSF-OCE78-25448
Pub. in Marine Geology, v38 p263-282 1980.

No abstract available.

AD-A093 669/0 Not available NTIS
Washington Univ., Seattle. Applied Physics Lab.
The Three-Dimensional Mapping of a Small Thermohaline Intrusion,
M. C. Gregg. 25 Jan 80, 26p
Availability: Pub. in Jnl. of Physical Oceanography, v10 n9 p1468-1492 Sep 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 670/8 Not available NTIS
Washington Univ., Seattle. Dept. of Oceanography.
High Resolution Salinity Measurement Techniques,
M. C. Gregg, and A. M. Pederson. 1980, 30p Rept no. CONTRIB-987
Availability: Pub. in Air-Sea Interaction, p319-348 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 674/0 PC **A09**/MF **A01**
Oregon State Univ., Corvallis. School of Oceanography.
Towed Thermistor Chain Observations in Fronts-80,
C. A. Paulson, R. J. Baumann, L. M. DeWitt, T. J. Spoering, and J. D. Wagner. Oct 80, 189p Rept nos. DATA-85, REF-80-18
Contracts N00014-79-C-0004, N00014-76-C-0067

Observations of temperature and pressure in the upper 100 meters were taken with a towed thermistor chain in January 1980 north of Hawaii. The observations were taken as a part of a cooperative investigation of the North Pacific subtropical front entitled FRONTS-80. The chain was towed on four occasions over a total 700 nautical miles between latitudes of 26 and 34 degrees N. The observations were averaged over sequential 30-s intervals and cross-sections of temperature and temperature profiles were plotted. The observations show that the surface expression of the North Pacific subtropical front was composed to multiple fronts having temperature contrasts ranging from a few tenths to about 2 degrees C. The horizontal gradients of surface temperature were as large as 0.5 C in 300 meters. Vertical temperature gradients associated with the fronts were both positive and negative. Changes in surface temperature across the fronts were usually, but not always, associated with salinity changes tending to minimize the change in density. On one occasion a 2 degrees C change in temperature across a front with no change in salinity was observed. (Author)

AD-A093 702/9 PC **A04**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
An Approach to the Quantitative Study of Sea Floor Topography.
Technical note,
J. E. Matthews. Jan 80, 64p Rept no. NORDA-TN-47
Includes two envelopes with maps.

This report represents an assessment of sea floor and sub-sea floor relief as related to acoustic bottom interaction. Marine topography, whose amplitude spans six orders of magnitude, is here divided into three broad categories: (1) features likely to cause propagation blockage, (2) features which act as sloping bottoms, and (3) features which act as acoustic scatterers. Maps of the North Atlantic and North Pacific Oceans are presented which delimit the areas where each of these three categories would be expected to dominate propagation.

AD-A093 747/4 PC **A03**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC.
Bathymetric Data Reduction Subsystem (BDRS),
John Lanier, Gordon M. Frank, and James P. Moran. Dec 80, 28p

The Bathymetric Data Reduction Subsystems(BDRS) represents a new concept in bathymetric data reduction processing. The BDRS is the primary support subsystem to the Bathymetric Information System(BIS). BIS is one of eight interactive data base systems to be developed under a global control system known as the Source Data Base System(SODS). SODS will provide users with both centralized access and information manipulation capability to these various information systems, including BIS. Users will have no direct access to BDRS, but they will be able to retrieve information from BIS through SODS. Through the use of various software programs the BDRS accepts digital data input from analog sources and magnetic tape. Output from the system will consist of proof plots, track-line generation, data base access and editing, and 'quick look' capabilities into the database. New developments contained in the system are: Voice recognition digitization system which allows the input of sounding data by spoken word; digitization of fathograms and the subsequent proof-plot generation using ship's log and the digitized soundings; and, the ability to geo-section portions of the data base using circular, triangular, or polygonic searches to define user areas of interest. (Author)

AD-A093 841/5 PC **A08**/MF **A01**
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
A Collection of Reprints,
Harry H. Roberts, J. N. Suhayda, J. M. Coleman, S. A. Hsu, and R. E. Larson. 1980, 151p Rept nos. TR-302, TR-304
Contract N00014-75-C-0192
Pub. in various jnls. 1980. Includes Rept. nos. TR-305 thru TR-311.

No abstract available.

AD-A093 949/6 PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
A Deep Profile of Some Biologically Important Properties in the Central North Pacific Gyre,
P. M. Williams, A. F. Carlucci, and R. Olson. 12 Dec 79, 9p
Contracts N00014-75-C-0152, DE-AMO3-76-SF00010
Pub. in Oceanologica Acta, v3 n4 p471-476 1980. Summary in English.

No abstract available.

N81-15425/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Corrections of Anomalous Time Dependent Shifts in the Brightness Temperature from the Nimbus 5 ESMR.
J. C. Comiso, and H. J. Zwally. Nov 80, 23p NASA-TM-82055

Temporal variations of the brightness temperature of selected regions representing ocean, sea ice, and ice sheets were studied. Shifts that could not be ascribed to geophysical effects were found to occur during the same periods in the various regions. The procedures employed to correct for these shifts are described.

PB81-154957 PC **A07**/MF **A01**
National Earth Satellite Service, Washington, DC.
Report of the Conferences on the National Oceanic Satellite System,
John W. Sherman, III. Sep 80, 139p NOAA-80123103

Approximately 400 persons participated in five Conferences on the potential National Oceanic Satellite System. The purpose of this report is to document the presentations and discussions at the Conferences and to present the initial analyses of the Conference Worksheets completed by 144 marine operational and research users. The report includes the points raised by these users and presents a series of findings and concerns.

8K. Seismology

AD-A093 470/3 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Crust-Mantle Whispering Gallery Phases: A Deterministic Model of Teleseismic P sub n Wave Propagation.
Journal article,
William H. Menke, and Paul G. Richards. 1 Nov 79, 8p Rept no. LDGO-3004
Contract N00014-80-C-0654, Grant NSF-EAR78-14481
Pub. in Jnl. of Geophysical Research, v85 nB10 p5416-5422, 10 Oct 80.

No abstract available.

AD-A093 791/2 PC **A05**/MF **A01**
Weidlinger Associates, Menlo Park, CA.
Site-Dependent Ground Motions from Distant Earthquakes.
Final rept. Nov 79-Sep 80,
G. L. Wojcik, J. Isenberg, and W. S. Dunbar. 30 Nov 80, 94p R-8065, AFOSR-TR-80-1377
Contract F49620-80-C-0009

This study considers geologic and seismological reasons for patterns of guidance alarms in Minuteman Wing V due to the 1975 Pocatello Valley, Idaho and 1979 St. Elias, Alaska earthquakes. The main geologic feature identified that can produce the observed effect is the thickness of sediments overlying Precambrian basement rock. Near vertically-incident P and S seismic waves which propagate directly from the source through the crust and upper mantle can interact with this structure. A velocity model based on oil well log data and a Has-

kell-Thompson formulation for body wave propagation in a layered model indicate that amplitude of peak ground shaking can vary by a factor of 2 at adjacent Wing V Flights due to variations in sediment thickness and wavespeeds. Interaction of surface waves with the same sedimentary layer is currently being studied and is the subject of a forthcoming report. Escarpments, basin edges and similar features are not likely to cause the observed distribution of alarms because they produce resonances at periods too short to affect the Missile Guidance Set. (Author)

AD-A093 794/6 PC **A07**/MF **A01**
Systems, Science and Software, La Jolla, CA.
Analysis of the Low Frequency Ground Motion Environment for MX. Surface Waves and Valley Reverberation
Final rept. 5 Dec 78-31 Dec 79,
J. R. Murphy, and T. J. Bennett. 2 Jan 80, 145p
SSS-R-80-4298, DNA-5219F
Contract DNA001-79-C-0114

This report summarizes the results of investigations into the effects on explosion-generated ground motion of the MX system siting environment in alluvial valleys. The objective of the analyses described in the report has been to develop a better, quantitative understanding of the late-time, low-frequency ground motion expected in such environments in order to provide a firmer basis for scaling to untested geologic environments and attack conditions. The studies reported have focused on two aspects of the problem of low-frequency surface waves which dominate the ground motion generated by blasts in MX valleys: (1) definition of site and yield dependence of ground motion characteristics at alluvial valley sites, and (2) possible enhancement of ground motion at sites in alluvial valleys due to surface-wave reverberation. (Author)

AD-A093 798/7 PC **A04**/MF **A01**
Paris-6 Univ. (France). Lab. de Geophysique Appliquee.
Seismic Crustal and Subcrustal Phases Propagation.
Final rept. 1 Jan-30 Sep 80,
P. Mechler, M. Nicolas, A. Chaouch, and B. Massinon. 30 Oct 80, 66p AFOSR-TR-80-1380
Grant AFOSR-80-0082

Some thirteen earthquakes which occurred around or inside France generated local waves recorded on the French seismic network run by L. D. G. up to 1500 km. A rather qualitative study of these phases (Pn, Pg, Sn, Lg) was first conducted: phase identification, velocities computation, attenuation versus epicentral distance, comparison of the different quakes. Pn and Sn waves are not very sensitive to superficial propagation anomalies and have attenuation factor around gamma = 2 with A proportional to K D to the -gamma power (D: distance). On the contrary Pg and Lg phases propagating through the crust are more sensitive to geological anomalies, and have consequently more dispersed attenuation factors. For one of the thirteen earthquakes (off shore Brittany - 01. 15. 78) local phases have been studied in more details. By filtering process, the attenuation factor for each phase was computed versus distance from 0.5Hz to 16Hz. For each local wave, high frequency amplitudes attenuate stronger than low frequency amplitudes, with distance. The maximum energy of Pn phases lies in the 8-16Hz band for distances below 400 km, and shifts to the 4-8Hz band for distances beyond 400 km. Similarly Pg phases maxima shift from 4-8Hz to 2-4Hz for the same distance ranges, Lg maximum energy is found in the 0.5-4Hz band except for very short distances. In fact Lg attenuation factor versus distance increases with frequency, from 1.5 (0.5-1Hz) to 3.9 (8-16Hz). On the other hand, the quality factor Q computed for each local phase also shows a clear increase with frequency.

AD-A093 849/8 PC **A02**/MF **A01**
Rondout Associates, Inc., Stone Ridge, NY.
Seismic Discrimination at Regional Distances.
Annual technical rept. no. 1, 1 Oct 79-30 Sep 80. 1 Nov 80, 16p AFOSR-TR-80-1378
Contract F49620-80-C-0021, ARPA Order-3291

Under this program, the University of Nevada has provided the sensing elements, the site electronics and the data recording system. Rondout Associates, Inc. built the vaults at the remote sites, constructed power and telephone data transmission facilities and routinely operates the data recording system located at the RAI corporate office at 1 Stilba Lane in Stone Ridge, New York. Data from the array are recorded continuously on digital magnetic tapes with a sampling rate of 25 samples per channel. The original data are saved for a period of approximately one (1) week. Data for a particular event of interest are mailed to the University of Nevada for analog play out and subsequent analyses.

AD-A093 960/3 PC **A05**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Marine Seismic Display Enhancement Program. Volume I. Results.
Final rept.,
Martin G. Fagot. Jan 78, 92p Rept no. NORDA-TN-13
See also Volume 2, AD-A079 743. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The quality of marine seismic profiling data governs the geophysicist's ability to interpret the geological character of the ocean sub-bottom structure. This report presents the results of a development program in the areas of data acquisition, processing and display to enhance single channel deep water marine seismic profiling data. A digital data acquisition system with a multi-channel (16) analog input capability has been developed. The system has a sampling rate up to 10 kHz with 72 dB dynamic range. Basic processing software has been implemented for the UNIVAC 1108 or CDC 6600 computers to enhance data quality through signal-to-noise improvement and increased resolution. The software includes time domain filtering, frequency domain filtering, Wiener filtering, spectral analysis and trace stacking. Wiggle traces can be generated through a CalComp or Zeta software routine. A display playback system for the processed data with multi-format capability has been developed. The system generates outputs for the conventional line scan recorder, an X-Y plotter and a fiber optic recorder. Display formats include intensity modulated line scan, wiggle traces and variable area half-wave rectified wiggle traces. Playback rates up to 40 times real time acquisition are possible. Selected sections of the field data are, also, presented in a color format. Recommended field procedures for acquisition of single channel marine seismic profiling data optimized for subsequent data processing are presented.

LA-8579-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Earthquake Catalog for Northern New Mexico. Progress Report, September 1973-December 1979.
D. J. Wechsler, D. J. Cash, K. H. Olsen, N. J. McFarland, and J. J. Wolff. Oct 80, 36p
Contract W-7405-ENG-36

This report is a summary of the earthquakes in northern New Mexico located by the Los Alamos Scientific Laboratory seismic array. Data are presented in the form of tables and epicenter maps, with a brief explanatory text. (ERA citation 06:006663)

PB81-150310 PC **A09**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Civil Engineering.
A Study of the Engineering Characteristics of the 1971 San Fernando Earthquake Records Using Time Domain Techniques,
William E. Bond, Ricardo Dobry, and Michael J. O'Rourke. Jun 80, 182p CE-80-1, NSF/RA-800304
Grant NSF-PFR79-02871

Accelerograms recorded at ground elevation during the 1971 San Fernando, California earthquake were examined by four time domain techniques: (1) the Husid plot of energy buildup; (2) root mean square acceleration; (3) principal planes of ground motion; and (4) the response envelope of a simple degree of freedom system. Through use of these techniques a part of the accelerograms that includes arrival of S-waves from the source was identified computationally. This strong part is characterized by two parameters--the duration and level of shaking. Horizontal plane root mean square acceleration was used to provide a measure of the level of shaking which is independent of the orientation of the recording devices. Attenuation of the root mean square acceleration with distance was generally consistent with an equation which relates the root mean square accelerations with the earthquake source parameters. A traveling Rayleigh wave was identified at two deep soil sites. Studies suggest this wave may have been caused by shallowness of the faulting process. These time domain techniques have demonstrated their usefulness in characterizing the San Fernando earthquake motions for engineering purposes.

PB81-854911 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Seismic Surveys for Onshore Petroleum and Natural Gas Exploration and Production. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Dec 80, 188p

This retrospective bibliography contains citations concerning seismic surveying theory, techniques, interpretation, and equipment for petroleum and natural gas exploration and production. Worldwide surveys and studies of specific onshore geographic locations and geologic formations are also included. (Contains 199 citations, fully indexed and including a table of contents.)

PB81-854929 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Seismic Surveys for Offshore Petroleum and Natural Gas Exploration and Production. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Dec 80, 111p

This retrospective bibliography contains citations concerning seismic surveying theory, techniques, interpretation, and equipment for offshore petroleum and natural gas exploration and production. Worldwide surveys and studies at specific offshore geographic locations and geologic formations are also included. (Contains 105 citations, fully indexed and including a table of contents.)

8L. Snow, Ice, and Permafrost

PB81-149577 PC **A07**/MF **A01**
World Data Center A for Glaciology, Boulder, CO.
Ice Cores,
P. K. MacKinnon. May 80, 146p GD-8, NOAA-80110707
Also pub. as ISSN-0149-1776.

As part of the Data Center's long-term program to establish data bases on global snow and ice parameters, a two-year project relating to ice core data has been carried out. This report documents most of the ice cores so far collected on a worldwide basis, as well as providing information on literature sources and on the current status of research activities which may affect the types of data than can be archived. The characteristics and structure of the World Data Center's data base system for ice core data are also described.

8M. Soil Mechanics

AD-A093 523/9 Not available NTIS
Washington Univ., Seattle. Quaternary Research Center.
Laboratory Measurements of Subsurface Displacements during Thaw of Low-Angle Slopes of a Frost-Susceptible Soil,
Robert G. Rein, Jr., and Chester M. Burrous. Nov 79, 11p ARO-12913.8-GS

Grants DAAG29-76-G-0056, NSF-DPP75-05383
Availability: Pub. in Arctic and Alpine Research, v12 n3 p349-358 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 955/3 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Computer Programs for Settlement Analysis.
Final rept.,
Reed L. Mosher, and N. Radhakrishnan. Oct 80, 97p Rept no. WES-INSTRUCTION-K-80-5

This report documents and gives example runs of three computer programs for performing settlement analysis of foundations and embankments. The programs are I0016, MAGSETII, and FD31. Program I0016 determines vertical stresses beneath footings and embankments. MAGSETII was written to calculate the magnitudes of settlement of multilayered soil systems. FD31 was developed to determine time-settlement relationships for cohesive soils due to large uniformly distributed loads.

N81-15424/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
System Calibration of the 1.4 Ghz and 5 Ghz Radiometers for Soil Moisture Remote Sensing.
J. Wang, J. Shiue, W. Gould, J. Fuchs, and E. Hirschmann. Nov 80, 29p NASA-TM-82043

Two microwave radiometers at the frequencies of 1.4 GHz and 5 GHz were mounted on a mobile tower and used for a remote sensing of soil moisture experiment at a Beltsville Agriculture Research Center test site. The experiment was performed in October 1979 over both bare field and fields covered with grass, soybean, and corn. The calibration procedure for the radiometer systems which forms the basis of obtaining the final radiometric data product is described. It is estimated from the calibration results that the accuracy of the 1.4 GHz radiometric measurements is about + or - 3 K. The measured 5 GHz brightness temperatures over bare fields with moisture content greater than 10 percent by dry weight are about 8 K lower than those taken simultaneously at 1.4 GHz. This could be due to either (1) a 5 GHz antenna side lobe seeing the cold brightness of the sky, or (2) the thermal microwave emission from a soil being less sensitive to surface roughness at 5 GHz than at 1.4 GHz.

PB81-148629 PC **A05**/MF **A01**
Oklahoma Dept. of Transportation, Oklahoma City. Research and Development Div.
Lime Treated Subgrade Soils: An Evaluation.
Final rept. Jul 73-Dec 79.
Dec 80, 90p FHWA/OK-80/133

The results of an evaluation of lime treated subgrade soils in Oklahoma are presented. The treated roadway extents ranged widely with respect to geographic area, climatic conditions, soil type, age, and contractor. Many laboratory test procedures were conducted on samples taken from untreated and treated subgrade soils. The effectiveness of the lime treatment after the roadways had been in service for at least 5 years varied widely. Typically plasticity, shrinkage, and swelling of subgrade soils were reduced, while apparent particle size, and pH were increased. The Oklahoma Subgrade Index, on which pavement thickness designs are based, was reduced sufficiently to justify the allowance of one-half inch of equivalent base thickness for one inch of lime treated subgrade.

PB81-154361 PC **A11**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Evaluation of Self-Boring Pressuremeter Tests in Boston Blue Clay.
Interim rept. May 77-Feb 79,
C. C. Ladd, J. T. Germaine, M. M. Baligh, and S. M. Lacasse. Sep 80, 243p R79-4, FHWA/RD-80/052
Contract DOT-FH-11-9264

The research performed 'undrained' self-boring pressuremeter tests (SBPT) at two sites in a deep marine clay deposit of moderate sensitivity (Boston Blue clay) having a decreasing overconsolidation ratio with depth. The program involved 20 tests with the French PAFSOR and 14 tests with the English CAMKOMETER devices. The initial pressure recorded after self-boring was generally much less than the insitu total horizontal stress, perhaps mainly due to improper installation techniques. However, the Marsland-Randolph graphical iteration method yielded quite reasonable estimates, especially in the upper 'stiff' clay, and this technique should be further evaluated via SBPT programs in other clay deposits. Vaues of undrained shear strength obtained from elastic-plastic and various derived methods of analysis were very sensitive to the input data, often showed considerable scatter and generally exceeded the in situ shear strength appropriate for bearing capacity and stability analyses. In particular, derived peak strengths in the deep 'soft' clay were too high by a factor of two or more. However, most of the tests did give reasonable estimates of undrained shear modulus.

8N. Terrestrial Magnetism

AD-830 065/9 PC **A03**/MF **A01**
Electro-Mechanics CO Austin Tex
Study of Techniques for Geomagnetic Field Measuring, Recording and Automatic Record Digitizing.
Final rept. 15 Aug 66-14 Jan 68,
Robert L. Waters, and Fred J. Morris. 15 Feb 68, 33p AFCRL-68-0102
Contract AF 19(628)-6151
Distribution limitation now removed.

The goals of the program were all related to magnetic measurements and recording, and to the processing of geomagnetic data. A study of feasibility of a Variable-Mu Gradiometer, construction of a prototype Variable-Area Recorder, and further improvements to and operation of the DADA-MAGSCAN automatic magnetogram processing system, are described. 'A Feasibility Study of a Component Gradiometer (U),' Scientific Report 1, Part I (U) and Part II (S), 14 May 1967, describes the portion of the program covering the gradiometer study. (Author)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A093 492/7 PC **A05**/MF **A01**
Texas Instruments, Inc., Dallas. Semiconductor Group.
Electromigration Testing of Al-Alloy Films.
Final technical rept. 25 Sep 78-30 Jun 80,
P. B. Ghate. Oct 80, 85p TI-03-80-29, RADC-TR-80-328
Contract F30602-78-C-0186

A search for reliability improvement of Al film interconnections has led to the introduction of Al-Alloy films such as Al+Cu, Al+Cu+Si and so on. This report describes the results of an in-depth study of Al, Al+Cu (2 wt % Cu) and Al+Cu+Si (2 wt % Cu + 1% Si) film interconnections and Silicon/Al-Alloy film contacts as they impact reliability of integrated circuits. Resistivity, microstructure and composition of Al-Alloy films vacuum deposited from an induction heated source (IN-Source) and dc magnetron sputter deposition techniques have been investigated and it is concluded that IN-Source and dc magnetron sputter deposition tecniques are equally capable of producing Al, Al+Cu (2 wt %) and Al+Cu+Si (2 wt % Cu + 1% Si) films of comparable compositions, resistivity and microstructure. Chemical Analysis X-Ray Fluorescence Electron Microprobe, Scanning and Transmission Electron Microscopy and Ion Microprobe have been employed for Al-Alloy film characterization. Availability of automated dc magnetron sputter (M-S) deposition equipment was a primary factor in the selection of magnetron sputter deposited Al-Alloy films for electromigration testing. (Author)

AD-A093 941/3 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Multilayered Open Dielectric Waveguide with a Gyrotropic Layer.
Technical rept.,
Ikuo Awai, and Tatsuo Itoh. 30 Sep 80, 15p Rept no. UT-MW-N-81-1
Contract N00014-79-C-0553
Pub. in Internationa Jnl. of Infrared and Millimeter Waves v2 n1 p1-14 1981.

No abstract available.

AD-146 273/8 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Application of Ferromagnetic and Ferroelectric Materials to Inductor Design for Countermeasures Receivers
SAMUEL STIBER. 1957, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

DOE/ET/29298-T1 PC **A19**/MF **A01**
Westinghouse Electric Corp., Athens, GA. Distribution Transformer Div.
Optimization of Distribution Transformer Efficiency Characteristics. Final Report.
H. Braunstein. 4 Dec 79, 428p
Contract AC01-78ET29298

A method for distribution transformer loss evaluation was derived. The total levelized annual cost method was used and was extended to account properly for conditions of energy cost inflation, peak load growth, and transformer changeout during the evaluation period. The loss costs included were the no-load and load power losses, no-load and load reactive losses, and the energy cost of regulation. The demand and energy components of loss costs were treated separately to account correctly for the diversity of load losses and energy cost inflation. An analysis was performed to find what level of transformer loss yields the minimum total levelized annual cost for a given kVA rating and a given set of load and cost parameters. Initial transformer costs as a function of no-load loss, load loss, and kVA were generated and used in the evaluation. Both single and multiple efficiency designs were considered. The total levelized annual costs of the two designs were compared. In each case the multiple efficiency design was less costly. A sensitivity analysis was performed to find the change in total levelized annual cost due to changes in the input parameters. Also, an analysis was conducted to determine the amount of energy required to produce the materials for distribution transformers. It was determined that the energy content of the extra materials used to produce a higher efficiency transformer was less than the amount of energy saved in operating costs. Therefore, from a total energy standpoint, it is worth using the extra energy to manufacture a more efficient transformer. Recommendations for distribution transformer efficiency characteristics and recommendations for further investigation are included. (ERA citation 06:006038)

N81-15193/8 PC **A13**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Study of Digital Charge Coupled Devices.
Final rept.,

D. D. Wilson, and V. F. Young. Dec 80, 283p
NASA-CR-161630, MCR-80-615
Contract NAS8-33194

Charge coupled devices represent unique usage of the metal oxide semiconductor concept. These devices can sample an AC signal at the input, transfer charge proportional to this signal through the CCD shift register and then provide an output of the same frequency and shape as the input. The delay time between input and output is controlled by the CCD operating frequency and the number of stages in the shift resister. This work is a reliability evaluation of the buried channel and surface channel CCD technologies. The constructions are analyzed, failure modes are described, and test results are reported.

PAT-APPL-6-067 858 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Acceleration Switch.
Patent Application,
J. P. Abbin, Jr., J. N. Middleton, and H. E. Schildknecht. Filed 20 Aug 79, 9p
Contract AT(29-1)-789
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved acceleration switch is described which is of the type having a mass suspended within a chamber, having little fluid damping at low g levels and high fluid damping at high g levels. (ERA citation 06:006375)

PAT-APPL-6-070 545 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Acceleration Switch.
Patent Application,
J. P. Abbin, Jr., H. F. Devaney, and L. W. Hake. Filed 29 Aug 79, 9p
Contract AC04-76DP00789
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The disclosure relates to an improved integrating acceleration switch of the type having a mass suspended within a fluid filled chamber, with the motion of the mass initially opposed by a spring and subsequently not so opposed. (ERA citation 06:006374)

PAT-APPL-6-160 880 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Self-Aligned Recessed Gate with Low Source Resistance.
Patent Application,
Steve Gray Bandy, and Clifford Nishimoto. Filed 16 Jun 80, 9p AD-D008 069/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A self-aligned recessed gate with low source resistance has an epitaxial structure with an n(+) contact layer. Source and drain contacts are put down, followed by resist spin-on and gate exposure. The gate channel is anodically thinned to expose the n active layer. The gate metal is evaporatively applied through the same resist opening which defines the gate channel. An insulating layer is laid down between the resist and the FET structure with ohmic contacts to prevent resist lifting, and a barrier layer is put over the ohmic contacts to provide insulating layer adhesion. The result is a sub-micron gate length FET having low source impedance. (Author)

PAT-APPL-6-167 866 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Flexible Loop Slip Ring Brush.
Patent Application,
John Brooks Haberl. Filed 14 Jul 80, 15p AD-D008 070/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Flexible wire loop slip ring brushes for use in miniaturized gyroscopes. A plurality of flexible wire loop brushes hug or embrace opposite peripheral sides of respective slip rings in resilient sliding contact over a substantial arc for establishing a redundancy of 'a' spots for assured paths through which electrical current may pass with minimal resistance. The rings and the brushes are gold alloy which in sliding contact provide good electrical conductivity and low noise. (Author)

PAT-APPL-6-214 926 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Refractory Passivated Ion-Implanted GaAs Ohmic Contacts.
Patent Application,
Aristos Christou, and John E. Davey. Filed 10 Dec 80, 7p AD-D008 067/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention provides a method of attaining n(+) regions with fine planar geometry in the source and drain of GaAs devices utilizing ion implantation which improves Ohmic contact with a refractory film. A layer of TiW refractory film is deposited on GaAs. Si29 ions are implanted in the GaAs through the refractory film so that the peak concentration is no more than approximately 100A below the TiW-GaAs interface. The entire structure is then annealed. A gold overlay is then deposited on the TiW layer to which electrical contacts may be attached and by which the contact resistivity is measured. Typical specific contact resistivity values are in the low 0.000001 ohm/sq cm range.

PAT-APPL-6-217 306 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Simplified Fabrication Method for High-Performance FET.
Patent Application,
Max Yoder. Filed 17 Dec 80, 11p AD-D008 076/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for making reproducible FET's with gate dimensions in the submicrometer range, reduced source-gate channel resistance, and reduced gate and source contact resistances comprising forming, in order, on a semi-insulating substrate of GaAs, an N-type GaAs layer, an (N+) GaAs layer and an (N++) Ge layer, using a photolith process with a mask to form the gate channel region therein, forming a refractory metal layer covering the whole top of the device, forming a gold layer on the refractory metal, using a photolith method with a common mask and etch process to cut the gate, source and drain electrodes to their desired sizes and using a plasma etch process to cut away, except for a stalk supporting the gate Au electrode, the remaining refractory metal from a portion of the gate channel lying between the gate and source electrode region and lying between the gate and drain electrode region. (Author)

PAT-APPL-6-217 977 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
High Performance Bipolar Microwave Transistor.
Patent Application,
Max Yoder. Filed 19 Dec 80, 11p AD-D008 077/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A high-frequency transistor and method of making same wherein the parasitic capacitance between base and collector is reduced. The collector layer of GaAs is impregnated with boron ions to form an insulative region under the base contact structure thereby reducing the capacitance in this region and leaving only the region underlying the emitter structure as the active transistor region. (Author)

PATENT-4 189 693
Not available NTIS
Department of Energy, Washington, DC.
Superconducting Magnet.
Patent,
J. A. Satti. Filed 28 Dec 77, patented 19 Feb 80, 8p PAT-APPL-865 345
Supersedes PAT-APPL-865 245-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A superconducting magnet designed to produce magnetic flux densities of the order of 4 to 5 Webers per square meter is constructed by first forming a cable of a plurality of matrixed superconductor wires with each wire of the plurality insulated from each other one. The cable is shaped into a rectangular cross-section and is wound with tape in an open spiral to create cooling channels. Coils are wound in a calculated pattern in saddle shapes to produce desired fields, such as dipoles, quadrupoles, and the like. Wedges are inserted between adjacent cables as needed to maintain substantially radial placement of the long dimensions of cross sections of the cables. After winding, individual strands in each of the cables are brought out to terminals and are interconnected to place all of the strands in series and to maximize the propagation of a quench by alternating conduction from an inner layer to an outer layer and from top half to bottom half as often as possible. Individual layers are separated from others by spiraled aluminum spacers to facilitate cooling. The wound coil is wrapped with an epoxy tape that is cured by heat and then machined to an interference fit with an outer aluminum pipe which is then affixed securely to the assembled coil by heating it to make a shrink fit. In an alternate embodiment, one wire of the cable is made of copper or the like to be heated externally to propagate a quench. (ERA citation 06:006370)

PB81-148579 PC **A03**/MF **A01**
Spire Corp., Bedford, MA.
Semiconductor Processing by Electron Beam Pulse-Induced Surface Reactions.
Final rept. 1 Oct 79-31 Mar 80,
A. R. Kirkpatrick. 1 Apr 80, 39p FR-60023, NSF/RA-800309
Grant NSF-DAR79-17715

The feasibility of a new concept for complete low temperature processing of advanced semiconductor devices using energy beams and associated induced surface reaction was established. Two cases of low temperature beam processing was investigated: (1) dopant introduction from surface sources; and (2) formation of grown oxides and nitrates. Excellent results have been obtained which infer general feasibility of semiconductor processing by directed energy and mass beams. In the case of dopant introduction from surface sources by means of energy pulse-induced redistribution, candidate procedures resulted in doped layers which could be considered for actual device utilization. These procedures could be implemented as standard processing routines. Results achieved relative to low temperature formation of grown oxides and nitrides on silicon have been promising. Introduction of the oxygen or nitrogen at some depth by means of high dose implantation has been successful. Stoichiometrically correct SiO2 and Si3N4 layers of high quality and thickness up to 0.2 micrometers have been achieved.

PB81-150922 PC **A02**/MF **A01**
Electricity Council Research Centre, Capenhurst (England).
Torsion Testing of Aluminium Strands from Corroded ACSR Conductors,
D. T. Hughes. Nov 80, 11p ECRC/M-1376

In order to facilitate the assessment of corroded aluminum overhead conductors, a simple torsion test has been devised which enables the mechanical condition of the aluminum strands to be determined. The simplicity of the test makes it ideal for use in the field.

UCRL-83997 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Elastomer Dielectric for Pulse Power.
L. P. Bradley, E. L. Orham, I. F. Stowers, and J. R. Braucht. 30 May 80, 11p CONF-8010125-1
Contract W-7405-ENG-48
Conference on electrical insulation and dielectric pheonomena, Boston, MA, USA, 29 Oct 1980.

Selected elastomer dielectrics are characterized as high-voltage insulators for use in pulse power systems. Silicone, ethylene-propylene rubber and polyurethene were tested, but most of the data is for silicone. The particular power system developed uses a formed silicone insulator 76 cm in dia. and 3 mm thick as the major insulator between capacitors, railgap switches, load, and return conduc-

tor. The capacitor array is dc charged to 50 kV, and has an on-load current risetime of 5 x 10 exp 12 A/s and 1 Ma peak current. The results showed that the use of an elastomer dielectric made possible the construction of a pulser one order of magnitude smaller than previously constructed pulsers having the same current characteristics. Also, use of the elastomer dielectrics in pulse power systems leads to improved production techniques and system reliability. (ERA citation 06:006406)

9B. Computers

AD-A093 463/8 PC **A03**/MF **A01**
Royal Signals and Radar Establishment, Malvern (England).
Checkpointing and Error Recovery in Distributed Systems,
J. A. McDermid. Sep 80, 27p RSRE-MEMO-3271, DRIC-BR-76154

This paper discusses some of the problems of producing fault tolerant distributed computer systems, in particular those of software error recovery. It shows how checkpoints may be used in error recovery, it defines the information that checkpoints must contain, and discusses alternate strategies for checkpointing. It describes models of error recovery and extends an existing recovery protocol to cater for certain types of checkpoint inconsistencies. The paper defines protocols for systematically generating checkpoints so that they can be used by the recovery protocols. It also defines a protocol for discarding checkpoints when they are no longer 'of use', which prevents the set of checkpoints growing indefinitely. The paper concludes by considering some of the problems of implementing the protocols. (Author)

AD-A093 464/6 PC **A02**/MF **A01**
Royal Signals and Radar Establishment, Malvern (England).
A Preliminary Implementation of POSER,
S. J. Bevan. Sep 80, 18p RSRE-MEMO-3272, DRIC-BR-76603

POSER is a process organisation to simplify error recovery intended for use in fault - tolerant, distributed computer systems running real - time programs. This memorandum describes the process organisation used in POSER and how the organisation has been experimentally implemented in a multi-computer simulation. Application program design has been studied by producing a large radar tracking program which runs on the POSER simulation. A version of the radar program exists in MASCOT and some comparisons of the two complete programs have been made. Finally, some broad comparisons of the MASCOT and POSER methods are made. (Author)

AD-A093 488/5 PC **A02**/MF **A01**
Office of Naval Research, London (England).
Simulation '80 Symposium.
Conference rept.,
Richard E. Nance. 21 Nov 80, 23p Rept no. ONRL-C-5-80

This report of the Simulation '80 Conference held in Interlaken, Switzerland on 25-27 June 1980, focuses on the methodological and technological sessions. The report is divided into four topical areas: (1) methodological issues, (2) computing hardware, (3) computing software, and (4) simulation applications. A concluding sumary draws a brief comparison between the current research interests in Europe and the US. (Author)

AD-A093 490/1 PC **A04**/MF **A01**
PRC Information Sciences Co., McLean, VA.
Raster to Lineal Conversion Software.
Final technical rept. 18 Jun 79-15 Aug 80,
Susan L. Farrance. Oct 80, 58p PRC-R-3266, RADC-TR-80-324
Contract F30602-79-C-0150

The purpose of the Raster of Lineal Conversion Software is to produce lineal feature files from data which has been digitized by raster scanning of the cartographic source. The particular objectives of this effort are to identify and correct shortcomings of the existing Raster to Lineal Conversion Software, and, secondly, to design and implement output modules to provide multiple output formats to facilitate editing of manuscripts.

AD-A093 496/8 PC **A16**/MF **A01**
Westinghouse Defense and Electronic Systems Center, Baltimore, MD. Advanced Technology Labs.
CCD Analog Programmable Microprocessor (APUP) Study.
Final technical rept. 21 Sep 78-15 Oct 79,
Donald R. Lampe, A. R. Gedance, I. A. Mack, S. J. Mederer, and J. Mattern. Aug 80, 355p RADC-TR-80-276
Contract F30602-78-C-0315

A cross-correlation of radar signal processing needs and CCD-compatible analog signal processing devices yielded a functional partitioning into several distinct candidates primarily on the basis of data storage time and data format. The azimuth processing function clearly preferred for implementation has two alternate architectures: the discrete correlation transform versus the two part combination of a corner-turn memory plus a transversal filter. The greater flexibility of the correlation transform scheme translates immediately into greater user acceptance, larger markets, and lower costs. The details of the transform/filter APUP candidate are given, including an ingenius new application of the traditional push/pull scheme to cancel even-harmonic distortion as well as offset fixed pattern noise arising from nonuniformities in thermal leakage or FET threshold. Also incorporated is a new additive refresh technique aimed at maintaining sample-to-sample isolation during multiple recirculations.

AD-A093 497/6 PC **A04**/MF **A01**
Pattern Analysis and Recognition Corp., Rome, NY.
Spectral Processing Analysis System (SPANS).
Final technical rept. Nov 78-Jul 80,
Robert E. Bozek. Nov 80, 53p PAR-80-48, RADC-TR-80-335
Contract F30602-79-C-0034

This effort designed and developed a real-time online signal processing and analysis program. Capabilities include off-line/on-line signal processing to 100 KHz, time and frequency domain transformations, high speed and high resolution refresh graphics. This report is an introduction to the system's hardware and software capabilities. (Author)

AD-A093 531/2 PC **A02**/MF **A01**
Dayton Univ., OH. Research Inst.
Computer Manipulation of Laboratory Data.
Technical rept. May 78-May 80,
George W. Fultz, and Terry L. Green. Aug 80, 23p AFWAL-TR-80-4106
Contract F33615-78-C-5127

Programs have been written for the CDC 6600 computer in Extended Fortran. The data input for the programs is entered remotely using a CRT terminal. It is possible with the remote terminal to observe data before plotting. The data may then be edited and drawn into plots at a remote plotting site. Operational use has shown the CDC 6600 computer to be a valuable instrument and time saving device for the manipulation of large numbers of data points. (Author)

AD-A093 549/4 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
The Theory Underlying the Partitioning of Permutation Networks,
Howard Jay Siegel. Aug 79, 12p AFOSR-TR-80-1151
Grant AFOSR-78-3581
Pub. in IEEE Transactions on Computers, vC.29 n9 p791-801 Sep 80.

No abstract available.

AD-A093 560/1 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
A Method for Specifying the Noise Suppression-Resolution Tradeoff in Digital Image Filtering with Local Statistics.
Final rept.,
Warren W. Willman. 11 Dec 80, 19p Rept no. NRL-8447

A modification of Lee's local-statistics method is developed for digital image noise filtering without the need for a user-specified noise level. Instead, the user specifies an approximate upper size limit for image features he is willing to regard as noise. A noise level is then estimated automatically for each local region of the image by partitioning the region into subregions and exploiting the differing degrees of spatial correlation for signal and noise. Extensions for use with multiplicative noise, third-moment statistics, and edge-detection schemes are discussed briefly. Examples are given for an image of 256 x 256 pixels. (Author)

AD-A093 597/3 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Implementation of the Graphics-Oriented Interactive Finite Element Time-Sharing System (GIFTS) on the PDP-11.
Master's thesis,
John Trevor Sheldon. Sep 80, 87p

The Graphics-oriented, Interactive, Finite Element Time-sharing System (GIFTS), written by Professor A. Kamel and Mr. Michael McCabe of the University of Arizona, has been implemented on the PDP-11 at the Naval Postgraduate School. This powerful system of programs was installed in a manner to facilitate its modification in the future. A very brief description of the GIFTS system, including the Unified Data Base, as well as the PDP-11 and RSK-11M operating system, are provided. Finally, a systematic approach to building and/or modifying the GIFTS system in the future is included. The approach taken includes a 'File Sorter' program which removes the need for much of the tedious work associated with building the system. (Author)

AD-A093 642/7 PC **A07**/MF **A01**
Rockwell International, Anaheim, CA. Autonetics Strategic Systems Div.
Bubble Memory Module.
Final rept.,
O. D. Bohning, and F. J. Becker. Dec 80, 138p C80-569/201, NASA-CR-3380
Contract NAS1-14174

This report covers development of a Bubble Memory Module as a general purpose storage unit in recorders or mass memory for spacecraft applications. Design, fabrication and test of a partially populated prototype recorder using 100 kilobit serial chips is described. Electrical interface, operating modes, and mechanical design of several module configurations are discussed. Fabrication and test of the module demonstrating the practicality of multiplexing and matrixing multiple bubble chip cells as a means of minimizing support circuitry resulting in lower power, weight, and volume. This effort resulted in the completion of a module consisting of a fully engineered printed circuit storage board populated with 5 of 8 possible cells and a wire wrapped electronics board. Interface of the module is 16 bits parallel at a maximum of 1.33 megabits per second data rate on either of two interface buses. (Author)

AD-A093 660/7 PC **A10**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
FAST Methodology & Case Study.
Final technical rept. 2 Feb 79-29 Aug 80. Nov 80, 215p RADC-TR-80-336
Contract F30602-79-C-0078

This report describes work done to implement and validate the Flexible, Analysis, Simulation and Test methodology developed by TRW to perform hardware software tradeoff analysis for computer system design. The methodology, partially developed with TRW IR&D funds, ws tested by a case study analysis using the Defense Mapping Agency's Management Information System for Procurement (DMIS/P). (Author)

AD-A093 732/6 PC **A02**/MF **A01**
Stanford Univ., CA.
Computational Complexity, Efficiency and Accountability in Large Scale Teleprocessing Systems.
Final rept. 1 Sep 78-31 Oct 80,

John T. Gill, and Martin E. Hellman. Dec 80, 6p
ARO-15843.3-EL
Contract DAAG29-78-C-0036

Research is summarized in the following areas: certified digital signals, factoring and random graphs, compact knapsacks, NP-complete problems, and indices in a finite field GF(q to the m power). (Author)

AD-A093 735/9 PC **A09**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC. Systems and Measurements Div.
Development of a Methodology for Verifying Military Computer Family Built-in-Test Performance Specifications.
Final rept. 22 May 79-21 May 80,
J. B. Clary, R. K. Joobbani, and F. M. Smith. Sep 80, 183p RTI/1822/00-01F, CORADCOM-80-0780-F
Contract DAAK80-79-C-0780

A previous study has addressed the identification of built-in-test (BIT) techniques for the Military Computer Family (MCF). In that study, appropriate BIT techniques were identified based upon an assumed fault population. A model was developed to predict where in the system these faults are most likely to occur. Based upon this model, a rationale was developed for deploying built-in-test resources and a unified BIT approach for MCF was recommended. A later study focused on the identification of relevant BIT requirements for Military Computer Family form, fit and function (F3) specifications. The present study was concerned with extending the BIT performance assessment methodology for verifying MCF built-in-test performance and the application of this methodology to a particular member of the Military Computer Family. The recommended approach is to describe MCF functional modules using ISP language descriptions. The PDP-11/70 member was selected as representative. The PDP-11/70 modules were verified to insure their proper functional behavior and the previously recommended BIT approaches were described in ISP and applied to these modules. In order to validate BIT performance for modules, a functional fault model was developed.

AD-A093 788/8 PC **A07**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Metrics of Software Quality.
Final rept.,
Zygmund Jelinski, P. B. Moranda, and J. B. Churchwell. Nov 80, 140p MDC-G9326, AFOSR-TR-80-1376
Contract F49620-77-C-0099
See also Rept. nos. MDC-G517, AD-A065 196 and MDC-G6533.

This report covers the period from 1 June 1977 to 30 October 1980. A major task on this contract was to make a comprehensive review of the literature on software metrics and of quantitative measures of program testing. Another accomplishment was the development of an automatic procedure for testing FORTRAN programs with random numbers and random symbols. This procedure first drives the program with sets of random data, then senses the tracks taken, compares each generated track against all predecessors, then on the basis of the pattern of occurrence of new tracks, provides an estimate of the total number of residual paths. Additional sets of random numbers can be then generated. The program developed to instrument a given FORTRAN program and provide data for evaluating coverage is described in the Final Report of earlier work (MDC G6553, dated December 1976). Changes which have been made are described herein. In the related topics of Software Reliability, two methods of estimating the residual error content of an entire program on the basis of data obtained in the testing of portions of it have been developed and are detailed here. (Author)

AD-A093 847/2 PC **A03**/MF **A01**
TRW Defense and Space Systems Group, San Bernardino, CA.
Missile X Protective Shelter C(3) Processor Study Report,
S. R. Rane. Dec 80, 26p BMO-TR-80-58
Contract F04704-80-C-0018

This study will show that an 8-bit microprocessor such as the Z80 is ideal for HSS processing tasks. Furthermore, by comparing DMA and Program I/O execution times, it is shown that the use of DMA does not enhance the HSS processors's processing capability. The NSA suggested dual processor architecture is analyzed to show the impact on reliability, power and cost. (Author)

AD-A093 874/6 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Systems Engineering Lab.
A Block-Oriented Equation Solver for the CRAY-1.
Interim rept.,
D. A. Calahan. 1 Dec 80, 38p SEL-136, AFOSR-TR-80-1375
Grant AFOSR-80-0158

This report describes algorithms, applications, and use of a general block-oriented sparse equation solver for a memory-hierarchial, functionally current vector processor, the CRAY-1. (Author)

AD-A093 878/7 PC **A03**/MF **A01**
Wharton School, Philadelphia, PA. Dept. of Decision Sciences.
Constructing Superviews.
Technical rept. Apr 80-Mar 81,
Amihai Motro, and Peter Buneman. Nov 80, 31p Rept no. 80-11-09
Contract N00014-75-C-0462

A method is described for integrating two or more databases into a conceptual superview, through a set of schema transformations. Such integration may be useful when it is required to produce a unified view of two databases while preserving their physical independence. Each transformation defines a mapping of queries against the superview into the appropriate set of queries against the underlying data bases and imposes a constraint that is checked when the query is evaluated. A program that interactively aids the user in constructing the superview and that performs this query transformation is being developed. (Author)

AD-A093 886/0 PC **A10**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
EMACS Manual for Twenex Users.
Memorandum rept.,
Richard M. Stallman. Sep 80, 210p Rept no. AI-M-555
Contract N00014-75-C-0643

This manual documents the use and simple customization of the display editor EMACS with the Twenex (Officially known as TOPS-20) operating system. The reader is not expected to be a programmer. Even simple customizations do not require programming skill, but the user who is not interested in customizing can ignore the scattered customization hints. This is primarily a reference manual, but can also be used as a primer. (Author)

AD-A093 887/8 PC **A09**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
SOFE: A Generalized Digital Simulation for Optimal Filter Evaluation. User's Manual.
Final rept. 1 Jan 76-31 Jul 80,
Stanton H. Musick. Oct 80, 195p Rept no. AFWAL-TR-80-1108

This report describes a general-purpose program that was developed to help design and evaluate Kalman filters for integrated systems. The program, which is named SOFE, is a Monte Carlo simulation that can be used for system performance analysis once the Kalman filter is designed and verified. SOFE is written in FORTRAN and is intended for batch use on a digital computer. This report is a complete user's manual for SOFE. It documents the equations used, the program structure, the input requirements and output options, and concludes with examples of SOFE use in both linear and nonlinear (extended) Kalman filter design studies. SOFE is divided into two modules named basic SOFE and user-written SOFE. Basic SOFE accomplishes all of the usual bookkeeping and integration functions of a Monte Carlo simulation (see below) and, in addition, provides the algorithm for measurement update of the user's filter. As its name implies, user-written SOFE is a module of FORTRAN-coded subroutines supplied by the user. These routines specify the system under study, including both truth and filter components. The rationale for this division, which places the constant routines in basic SOFE and the variable routines in user-written SOFE, is to free the designer to concentrate on more central issues including problem definition, model specification, model validation, and insight acceleration through experimentation. The 31 routines of basic SOFE perform I/O (including printer plots), problem setup, run setup, numerical integration of the ordinary differential equations that specify the system dynamics, measurement update, run termination and problem termination.

AD-A093 891/0 PC **A02**/MF **A01**
General Electric Co., Syracuse, NY. Military Electronic Systems Operation.
Computer-Aided Development of Control Console, Control Panel, and Display User Instructions and Training Materials.
Technical information series,
S. A. Solow, and W. O. Mills. Oct 80, 13p Rept no. R80EMH9

This technical information series (TIS) outlines a procedure for developing instructions and training materials for control panel operation and indicator and display interpretation. The method is particularly advantageous when the operator has to observe and respond to large amounts of data and manipulate many controls. The process is described in this TIS as it is applied to the preparation of information for the tactical towed array sonar (TACTAS) System Operator's Manual. However, it can be applied with slight modification to systems having similarly complex man-machine interfaces. Data input, storage, processing, and output are performed by the time-share subsystem (TSS) of the Honeywell 520 Data Processing System (level 66).

AD-A093 932/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Interfacing the One-Dimensional Scanning of an Image with the Applications of Two-Dimensional Operators.
Memorandum rept.
Shimon Ullman. Apr 80, 14p Rept no. AI-M-591
Contract N00014-75-C-0643, Grant NSF-MCS77-07569

To interface between the one-dimensional scanning of an image, and the application of a two dimensional operator, an intermediate storage is required. For a square image of size n to the 2nd power and a square operator of size m to the 2nd power the minimum intermediate storage is shown to be n (m-1). An interface of this size can be conveniently realized by using a serpentine delay line. New kinds of imagers would be required to reduce the size of the intermediate storage below n (M-1).

AD-A093 933/0 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
The Design Procedure Language Manual.
Memorandum rept.,
John Batali, and Anne Hartheimer. Sep 80, 83p Rept no. AI-M-598
Contracts N00014-75-C-0643, N00014-80-C-0622

This manual describes the Design Procedure Language (DPL) for LSI design. DPL creates and maintains a representation of a design in a hierarchically organized, object-oriented LISP database. Designing in DPL involves writing programs (Design Procedures) which construct and manipulate descriptions of a project. The programs use a call-by keyword syntax and may be entered interactively or written by other programs. DPL is the layout language for the LISP-based Integrated Circuit design system (LISPIC) being developed at the Artificial Intelligence Laboratory at MIT. The LISPIC design environment will combine a large set of design tools that interact through a common data-base. This manual is for prospective users of the DPL and covers the information necessary to design a project with the language. The philosophy and goals of the LISPIC system as well as some

details of the DPL data-base are also discussed. (Author)

AD-A093 934/8 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Spatial Planning: A Configuration Space Approach.
Memorandum rept.,
Tomas Lozana-Perez. Dec 80, 38p Rept no. AI-M-605
Contract N00014-77C-0389

This paper presents algorithms for computing constraints on the position of an object due to the pressure of obstacles. This problem arises in applications which require choosing how to arrange or move objects among other objects. The basis of the approach presented here is to characterize the position and orientation of the object of interest as a single point in a Configuration Space, in which each coordinate represents a degree of freedom in the position and/or orientation of the object. The configurations forbidden to this object, due to the presence of obstacles, can then be characterized as regions in the Configuration Space. The paper presents algorithms for computing these Configuration Space obstacles when the objects and obstacles are polygons or polyhedra. An approximation technique for high-dimensional Configuration Space obstacles, based on projections of obstacles slices, is described. (Author)

AD-A093 935/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Towards a Better Definition of Transactions.
Memorandum rept.,
Barbara S. Kerns. Dec 80, 13p Rept no. AI-M-609

This paper builds on a technical report written by Carl Hewitt and Henry Baker called 'Actors and Continuous Functionals'. What is called a 'goal-oriented activity' in that paper will be referred to in this paper as a 'transaction'. The word 'transaction' brings to mind an object closer in function to what we wish to present than does the word 'activity'. This memo, therefore, presents the definitions of a reply and a transaction as given in Hewitt and Baker's paper and points out some discrepancies in their definitions. That is, that the properties of transactions and replies as they were defined did not correspond with our intuitions, and thus the definitions should be changed. The issues of what should constitute a transaction are discussed, and a new definition is presented which eliminates the discrepancies caused by the original definitions. Some properties of the newly defined transactions are discussed, and it is shown that the results of Hewitt and Baker's paper still hold given the new definitions.

AD-A094 006/4 PC **A10**/MF **A01**
University of Southern California, Los Angeles. Image Processing Inst.
Image Understanding Research.
Semiannual technical rept. 1 Apr-30 Sep 80,
Ramakant Nevatia, and Alexander A. Sawchuk. 30 Sep 80, 210p Rept no. USCIPI-990
Contract F33615-80-C-1080, DARPA Order-3119

The purpose of this research program is to develop techniques and systems for understanding images, particularly for mappng applications. The research activity includes low level image analysis and feature extraction, statistical and sturctural texture analysis, symbolic image representations, and image to map correspondence using relational structures. Additional activity is concerned with VLSI architectures for implementation of image analysis and image understanding operations.

AD-846 505/6 PC **A10**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
Electro-Interference Test Report, Status Command Message Processing Group, OA-7528A/GSW-10, Figure A 1251.
Final rept.,
H. S. Hokenson. 26 Oct 66, 206p T2-3462-1, SAMSO-TR-68-278
Contract AF 04(694)-545

Includes Revision C dated 14 Jan 69. Prepared in cooperation with Radio Corp. of America, New York, N. Y.
Distribution limitation now removed.

This report contains electro-interference test data resulting from evaluation tests performed on Minuteman Figure A 1251M by RCA at Camden, N.J. and by Boeing at Seattle, Washington. Tests that were performed include susceptibility, radiated, and conducted. (Author)

CEA-N-2112 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Interactive Raster-Scan Graphic Terminal.
Y. Lussignol. Feb 80, 23p
In French.
U.S. Sales Only.

A raster-scan graphic terminal has been realized using a microprocessor MOTOROLA 6800. This system allows to show two-dimensional plots (256 x 256 pixels) as maps of intensity with eight different levels of brightness. A command language directed by a MENU was performed to help the physicist during the acquisition, the data reduction and analysis of multiparameter experiments. An electrostatic plotter is connected to this system. (Atomindex citation 11:541935)

INS-TEC-10 PC **A03**/MF **A01**
Tokyo Univ. (Japan). Inst. for Nuclear Study.
Beginner's Manual of TSS Terminal in Connection with the INS Central Computer.
T. Oshikubo. 1 Mar 79, 31p
In Japanese.
U.S. Sales Only.

One of the facilities of the newly installed INS central computer system, FACOM M-180IIAD, is TSS (Time Sharing System) service. It seems to be necessary for beginners to prepare a manual easy to use the TSS terminal without special education or knowledge. In this manual are described how to handle the terminal with several basic and practical examples, and an explanation of selected important commands. (Atomindex citation 11:526118)

JAERI-M-8349 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
System Program for MICRO-CAMAC Terminal System.
Y. Sasajima, T. Yamada, H. Yagi, and M. Ishiguro. Aug 79, 68p
In Japanese.
U.S. Sales Only.

A JAERI on-line network system was developed and exists for on-line data processing of nuclear instrumentation. As terminal systems for the network system, the one with a Micro -8 micro-computer is used. By modifying the control program for Micro-8 terminal system, a system program has been developed for a MICRO-CAMAC terminal system, which is controlled by a micro-computer framed within the CAMAC Crate Controller. In this report are described software specifications of the MICRO -CAMAC terminal system and its operation method. (Atomindex citation 11:542104)

LBL-11068 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Interactive SPIRES PLOT Protocol.
B. Cerny, G. Litton, and J. D. Lawrence. Jun 80, 14p
Contract W-7405-ENG-48

This report describes PLOT, a routine to plot a two-dimensional array of points from elements in any SPIRES database. Its use assumes access to a SPIRES database and knowledge of SPIRES querying and searching procedures. PLOT is not meant to be a replacement for more sophisticated on-line or off-line graphics packages compatible with SPIRES, but rather it gives immediate interactive plots that can be displayed at the terminal, saved, or disposed to a line printer. One can select records from a database, plot them, add other points or change the scale, if desired, and replot in order to get a feeling for the form and distribution of the data. PLOT can be used on either a hard-copy or CRT terminal, and it allows user adjustment of various parameters to generate a plot compatible with both the data and the terminal display capabilities. The search commands that generate the stack of data to be plotted are identical to those used in any other SPIRES search. Both indexed and non-indexed records can be accessed and plotted, and elements can be obtained from any depth within structures. (ERA citation 06:006803)

N81-15707/5 PC **A04**/MF **A01**
Harris Corp., Melbourne, FL. Government Information Systems Div.
Optical Mass Memory System (AMM-13). AMM/DBMS Interface Control Document.
G. A. Bailey. 29 Oct 80, 55p NASA-CR-161626, ESD-13535
Contract NAS8-33687

The baseline for external interfaces of a 10 to the 13th power bit, optical archival mass memory system (AMM-13) is established. The types of interfaces addressed include data transfer; AMM-13, Data Base Management System, NASA End-to-End Data System computer interconnect; data/control input and output interfaces; test input data source; file management; and facilities interface.

N81-15708/3 PC **A06**/MF **A01**
Harris Corp., Melbourne, FL. Government Information Systems Div.
Optical Mass Memory System (AMM-13). AMM-13 System Segment Specification.
G. A. Bailey. 29 Oct 80, 112p NASA-CR-161625, ESD-13530
Contract NAS8-33687

The performance, design, development, and test requirements for an optical mass data storage and retrieval system prototype (AMM-13) are established. This system interfaces to other system segments of the NASA End-to-End Data System via the Data Base Management System segment and is designed to have a storage capacity of 10 to the 13th power bits (10 to the 12th power bits on line). The major functions of the system include control, input and output, recording of ingested data, fiche processing/replication and storage and retrieval.

N81-15743/0 PC **A03**/MF **A01**
Mathematisch Centrum, Amsterdam (Netherlands).
Initial and Final Algebra Semantics for Data Type Specifications: Two Characterization Theorems.
J. A. Bergstra, and J. V. Tucker. Sep 80, 40p MC-IW-142/80
Submitted for Publication.

It is proved that those data types which may be defined by conditional equation specifications and final algebra semantics are exactly the cosemi-computable data types those data types which are effectively computable, but whose inequality relations are recursively enumerable. Also the computable data types are characterized as those data types which may be specified by conditional equation specifications using both initial algebra semantics and final algebra semantics. Numerical bounds for the number of auxiliary functions and conditional equations required are included in both theorems.

N81-15745/5 PC **A02**/MF **A01**
Mathematisch Centrum, Amsterdam (Netherlands).
Real-Time Turing Machines under Varying Specifications, Part 2.
P. M. B. Vitanyi. Sep 80, 13p MC-IW-147/80-PT-2
Submitted for Publication.

Numerical detail is given of the proof that k+1 heads are more powerful than k heads as a storage device for real time Turing machines. The proof technique is unusual in the induction phase, and has a wider range of applicability than the chosen counter example.

N81-15896/6 PC **A07**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Pixlib Pdp-11/34: Systems Documentation. A User-Oriented Tool for Layered Imagery Handling.
S. I. Aakersten. Apr 80, 129p FOA-C-309191-E1

The described programs form the foundation for a program library permitting a relatively easily handled manipulation and presentation of data which are representable in pictorial form. A program structure was developed in which the user-computer interaction is as tangible as possible rather than being merely a sequence of questions and answers using a keyboard terminal. They are implemented on a PDP-11/34 with the RSX-11M operating system and RAMTEK GX-100B image presentation equipment with trackball and TV-monitor.

PB81-141764 PC **A99**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
COBOL Programmer's Reference Manual.
Final rept.,
Carole Roelofs. Jul 80, 742p MTR-7942-REV-1
Sponsored in part by New York State Dept. of Labor, Albany. Center for Automated Matching Systems.

This document is the culmination of a thorough investigation into several major vendor's COBOL 74 reference manuals to determine the areas of commonality and difference. Unlike the American National Standards COBOL functions, this document addresses the existing capabilities as actually implemented by the vendors. The objective is to provide the data processing staff, with a usable COBOL programming handbook that spells out the common vendor capabilities, and offers approaches for handling differences in required functions.

PB81-146011 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Agricultural Handbook Number 456 (Data Set 456-3).
Data file,
Cecelia C. Wilkinson, and Betty Perloff. 1 Dec 80, mag tape USDA/DF-81/005
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB81-146656.

This file contains food composition data as published in tables 1 and 2 of Agriculture Handbook No. 456, issued 1975, $5.15 (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402). Twenty-one composition values are included: percent water, food energy, protein, fat, carbohydrates, fiber, ash, calcium, phosphorus, iron, sodium, potassium, vitamin A, thiamin, riboflavin, niacin, ascorbic acid, saturated fatty acid, oleic acid, linoleic acid, and cholesterol. These values are given for 3,147 food items whose quantities are given in terms of 100 grams edible portion. Food item numbers are assigned sequentially with the food descriptions in alphabetical order. A 20 character food name is inserted for every food item in the file. This data set has been updated with data from Agricultural Handbook Number 8-1 through 8-5.

PB81-146862 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Continuous Model of an Unreliable Two-Stage Material Flow System with a Finite Interstage Buffer,
Stanley B. Gershwin, and Irvin C. Schick. Sep 80, 64p LIDS-R-1039, NSF/RA-800333
Grant NSF-DAR78-17826

A two-stage material flow production system model is presented and analyzed. The material to be processed is continuous; the processing stages are unreliable; and a finite buffer stores material between the stages. The model is intended to facilitate study of the finite buffer and random behavior of the stages. It is justified as a representation of a production process in several ways. The relationship between this model and a model of discrete material flow is established. Performance measures, including production rate, average in-process inventory, and probabilities of starvation and blockage are calculated. Relationships among these measures are demonstrated and numerical experiments discussed. This kind of model can be used in several ways: to represent manufacturing systems such as transfer lines in which operations (e.g., metal cutting or assembly) occur at the stages; to represent the flow of information within a computer system or network; and to describe a water resource system or network in which the buffer is a reservoir and the stages are dams.

PB81-151409 PC **E03**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Federal CSS, Inc., IBM 360/370 OS/VS COBOL Release 2.3, PTR 8.
Validation summary rept.
21 Jan 81, 59p CCVS74-VSR645

This Validation Summary Report (VSR) for the Federal CSS, IBM 360/370 OS/VS COBOL Compiler Version 2.3 PTF8 (VP/CSS Version .304) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB81-152118 PC **A04**/MF **A01**
Federal Computer Performance Evaluation and Simulation Center, Washington, DC.
Computer Science and Technology: Computer Model Documentation Guide.
Final rept.
Jan 81, 61p NBS/SP-500-73
Library of Congress catalog card no. 80-600190.

This document provides guidelines for preparing documentation for computer models. Recommended structures for four types of manuals providing model information for four different classes of audiences (managers, users, analysts, and programmers) is presented. This document specifies the content of sections and subsections for each type of manual. Manuals prepared using these guidelines will enable persons interested in a model to understand the capabilities and limitations of that model.

PB81-803256 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Printers. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80.
Jan 81, 185p
Supersedes PB80-801343, and NTIS/PS-78/1218.

The bibliography cites research on computer printers, contact printers, projection printers, and microfilm reader-printers. Studies are included on the use of these printers in computer graphics, aerial photography, cartography, and data processing. (This updated bibliography contains 194 citations, 18 of which are new entries to the previous edition.)

PB81-803512 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Natural Language Processing. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 249p
Supersedes PB80-803307, and NTIS/PS-78/1313.

The bibliography of worldwide journal literature cites reports on natural language in many areas of application. Speech recognition, computer programming, information storage and retrieval, question-answering systems, man-computer communications, artificial intelligence, syntactic analysis, and computational linguistics are topics included. (This updated bibliography contains 242 citations, 68 of which are new entries to the previous edition.)

PB81-803520 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Natural Language Processing. 1978-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1978-Jan 81.
Feb 81, 105p
Supersedes PB80-803299, and NTIS/PS-78/1312.

The bibliography of Government-research cites reports on natural language in many areas of application. Topics such as speech recognition, computer programming, information storage and retrieval, question-answering systems, man-computer communications, artificial intelligence, syntactic analysis, and computational linguistics are included. (This updated bibliography contains 99 citations, 35 of which are new entries to the previous edition.)

SLAC-PUB-2640 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Front Panel Human Interface for FASTBUS.
D. B. Gustavson, T. L. Holmes, L. Paffrath, and J. P. Steffani. 1980, 3p CONF-801103-26
Contract AC03-76SF00515
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

A human interface based on the Snoop<1> diagnostic module has been designed to facilitate checkout of FASTBUS<2> devices, diagnosis of system faults, and monitoring of system performance. This system, which is a generalization of the usual computer front panel or control console, includes logic analyzer functions, display and manual-control access to other modules, a microprocessor which allows the user to create and execute diagnostic programs and store them on a minifloppy disk, and a diagnostic network which allows remote console operation and coordination of information from multiple segments' Snoops. (ERA citation 06:005633)

UCRL-52996 PC **A14**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Automation of Computational Physics.
M. C. Wirth. Oct 80, 318p
Contract W-7405-ENG-48
Thesis.

Software tools based on the algebraic manipulation system MACSYMA that facilitate the design, analysis, and construction of finite difference programs for the numerical solution of systems of partial differential equations are described. Four packages of tools are presented: VECT, FDIFF, FSTAB, and MACTRAN. The VECT package performs symbolic algebra and calculus with vectors and dyadics. It includes manipulations of dot and cross products; gradient, divergence, curl and Laplacian operators; directional derivatives and outer products. Vector and dyadic equations can be automatically expanded into components for arbitrary orthogonal coordinate systems. Scalar and vector potentials can be calculated from their gradient and curl vectors. The FDIFF package converts scalar, nonlinear partial differential equations into linear, finite difference aproximations. It includes tools for discretization of the domain of the PDE dependent variables, linearization of nonlinear terms, and conversion of derivative terms into finite difference expressions. A notation and algebra for building arbitrary finite difference operators is provided. The FSTAB package automatically performs local Fourier stability analyses on sets of finite difference equations by deriving amplification matrices and eigenvalues. The MACTRAN package converts the finite difference equations and other expressions into FORTRAN code. It provides a general purpose text processor that allows the derived FORTRAN code segments to be interspersed with fixed code from program skeletons to form complete FORTRAN programs. 6 figures, 21 tables. (ERA citation 06:006808)

9C. Electrical and Electronic Engineering

AD-A093 462/0 PC **A02**/MF **A01**
Royal Signals and Radar Establishment, Malvern (England).

A Comparison between Electric Field Strengths Similarly Generated and Measured in the Open Air, in a Shielded Enclosure and in a Large Aircraft Hangar, over Frequency Range 10 to 110 MHz,
M. Dew, and F. Harrison. Feb 80, 18p RSRE-MEMO-3248, DRIC-BR-73471

A difficulty found in some electromagnetic compatibility (EMC) measurements is illustrated by showing that a particular measurement yields significantly different results when performed in a certain shielded enclosure compared with those yielded when performed in the open air. It is also shown that when performed in a large aircraft hangar the results are tolerably the same as those yielded in the open air. On these facts it is suggested that a worthwhile use for an aircraft hangar no longer devoted to its original use would be to assign it wholly or in part as a location for EMC measurement work. Further, a large shielded enclosure is likely to provide results more in agreement with open air measurements than would a small enclosure similarly used. (Author)

AD-A093 491/9 PC **A05**/MF **A01**
CNR, Inc., Needham, MA.
Radio Frequency Modeling of Audio Frequency Systems.
Final technical rept. Sep 78-Nov 79,
James W. Graham, Charles J. Boardman, and William Welch. Oct 80, 90p RADC-TR-80-331
Contract F30602-78-C-0142

The results of an effort to develop techniques for radio-frequency modeling at frequencies to 500 MHz of audio-frequency systems and their nonlinear response to amplitude-modulated excitation are reported. The approach involves investigation of a test amplifier to guide the modeling effort and to provide a means for validation measurements. The amplifier is conductively excited between its metal case and ground as well as at normal input terminals. Special techniques to avoid excitation of indeterminate external modes were exployed. In addition to high-frequency models of electronic components with parasitic elements, it was necessary to develop wideband RF models for shielded ferrite-core low-frequency inductors. It was also necessary to include models of the printed-circuit etch. The physical geometry of component and printed circuit layout played a significant role in the model development. The detection process for demodulation of amplitude-modulated radio carrier excitation was modeled in terms of the second-order nonlinear transfer functions.

AD-A093 980/1 PC **A03**/MF **A01**
Rosenbaum (Harold) Associates, Inc., Burlington, MA.
Reduction of False Alarm Rates in Peripheral Detection Systems.
Topical rept. 5 Sep 78-31 Oct 79.
Roy H. Hines. 1 Feb 80, 40p DNA-5248T
Contract DNA001-78-C-0401

The distribution function of the time between false alarms which results from combining the output of two independent sensors in an AND-logic mode is derived. In particular, the false alarms from each sensor are assumed to be distributed according to Poisson laws (lambda 1 and lambda 2). A 'moving window' with a time interval tau is used such that an alarm for the combined system is triggered if, and only if, an alarm from each system occurs within an interval tau. Numerical results of using the derived distribution in combination with a simplified detection model are presented for a number of cases. (Author)

AD-302 315/7 PC **A08**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Proceedings of the Classified Session of the Symposium on Electromagnetic Interference
Jun 58, 164p Rept no. S-3074-58
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

DOE/ET/29305-T2 PC **A03**/MF **A01**
Commonwealth Associates, Inc., Jackson, MI.
Model for the Ready Definition and Approximate Comparison of Alternative High Voltage Transmission Systems. Phases II and III. Application to Electric Systems within the Contiguous United States.
Aug 79, 32p
Contract AC05-78ET29305

Research on power delivery alternatives is reported. The first phase of this work was to develop a model of overhead transmission systems in the range of 362 to 1200 kV ac, and +-400 to +-800 kV dc. Such systems included transmission from generation to load and inter-connection of two large integrated systems, with and without the existence of an underlying lower voltage network in either case. This phase has been completed. The second and third phases involved application of the model to electric systems within selected regions of the US, and the entire US, respectively, dealing with real situations and including projected expansion to year 1987. The potential benefits and costs of using higher than existing transmission voltages were to be evaluated on this basis. Additionally, the most advantageous new voltage was to be determined taking into account direct and indirect benefits and costs. The results of the second and third phases are presented. (ERA citation 06:006161)

EPRI-EL-1601 PC **A13**/MF **A01**
Ohio Univ., Athens. Dept. of Electrical Engineering.
Digital Revenue Metering Algorithm: Development, Analysis, Implementation, Testing, and Evaluation. Final Report.
E. O. Schweitzer III, H. W. To, and M. Ando. Nov 80, 299p

A digital revenue metering algorithm is described. The algorithm has been tested in a microcomputer system using two 8-bit MC6800 microprocessors and 12-bit analog-to-digital converters. The tests show that the system meets the accuracy requirements of ANSI C12-1975. The algorithm demands modest computing requirements and low data sampling rates. The algorithm uses Walsh-functions and will operate with as few as 4 samples per 60-Hz cycle. For proper response to odd harmonic frequencies, higher sampling rates must be used. Third harmonic power can be handled with an 8-sample per cycle Walsh function. However, even harmonics are effectively suppressed by the algorithm. The developed algorithm is intended for use in digital data acquisition systems for substations where interchange metering is required. (ERA citation 06:006041)

EPRI-EL-851(V.1) PC **A05**/MF **A01**
Institut de Recherche de l'Hydro-Quebec, Varennes.
Real-Time Digital Data Acquisition System for Determining Load Characteristics. Volume 1: Overview and Summary. Final Report.
B. Podesto, A. Lapointe, G. Larose, Y. Robichaud, and C. Vaillancourt. Dec 78, 77p

The work sponsored under this contract included the design and construction of a Real-Time Digital Data Acquisition System (RTDDAS) to be used in substations for on-site recording and pre-processing load response data. The gathered data can be partially processed on site, to compute the apparent, active and reactive powers, voltage and current rms values and instantaneous values of phase voltages and currents. On-site processing capability is provided for rapid monitoring of the field data to ensure that the test setup is suitable. Production analysis of field data is accomplished off line on a central computer from data recorded on a dual-density (800/1600) magnetic tape which is IBM-compatible. Parallel channels of data can be recorded at a variable rate from 480 to 9000 samples per second per channel. The RTDDAS is housed in a 30-foot trailer which is shielded from electromagnetic interference and protected by isolators from switching surges; therefore, it can operate safely in a high-voltage substation environment where the tests must sometimes be performed. This report defines the capabilities and summarizes the operating procedures for the RTDDAS. Prior to the RTDDAS development, IREQ conducted a seminar in September 1976 at which past IREQ accomplishments in load modeling were presented. The papers presented during the 1976 seminar are contained as appendices to this volume of the Final Report. (ERA citation 06:006039)

JPL-PUBL-79-35(V.2) PC **A07**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Distribution Automation and Control on the Electric Power System, Volume II: Proceedings.
Mar 79, 136p CONF-7811130-P2
Contract EC-77-A-31-1041
Distribution automation and control working group, Baltimore, MD, USA, 20 Nov 1978.

The meeting of the Distribution Automation and Control (DAC) Working Group was sponsored by the Department of Energy (DOE), Division of Electric Energy Systems, to provide a forum in which electric utilities could communicate with each other, with DOE, and with DOE's contractors regarding research, development, and demonstration efforts to apply DAC to the electric power system. In these discussions emphasis was to be placed on identifying the priorities and needs for DAC development. The subjects covered included the technical motivations for distribution automation; solar energy as an unconventional energy source; load management; economic and institutional factors; emergency controls, impact of controls on systems design, and related topics. (ERA citation 06:006044)

N81-15464/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Electronically Commutated DC Motors for Electric Vehicles.
E. A. Maslowski. 1981, 18p NASA-TM-81654, E-657
Contract DE-AI01-77CS-51044
Prepared for Presentation at Soc. Of Automotive Engr. Intern. Congr. And Exposition, Detroit, 23-27 Feb. 1981.

A motor development program to explore the feasibility of electronically commutated dc motors (also known as brushless) for electric cars is described. Two different design concepts and a number of design variations based on these concepts are discussed. One design concept is based on a permanent magnet, medium speed, machine rated at 7000 to 9000 rpm, and powered via a transistor inverter power conditioner. The other concept is based on a permanent magnet, high speed, machine rated at 22,000 to 26,000 rpm, and powered via a thyristor inverter power conditioner. Test results are presented for a medium speed motor and a high speed motor each of which have been fabricated using samarium cobalt permanent magnet material.

PAT-APPL-6-061 114 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Servo Control Booster System for Minimizing Following Error.
Patent Application,
W. L. Wise. Filed 26 Jul 79, 19p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A closed-loop feedback-controlled servo system is disclosed which reduces command-to-response error to the system's position feedback resolution least increment, delta S/sub R/, on a continuous real-time basis, for all operational times of consequence and for all operating speeds. The servo system employs a second position feedback control loop on a by exception basis, when the command-to-response error greater than or equal to delta S/sub R/, to produce precise position correction signals. When the command-to-response error is less than delta S/sub R/, control automatically reverts to conventional control means as the second position feedback control loop is disconnected, becoming transparent to conventional servo control means. By operating the second unique position feedback control loop used herein at the appropriate clocking rate, command-to-response error may be reduced to the position feedback resolution least increment. The present system may be utilized in combination with a tachometer loop for increased stability. (ERA citation 06:006376)

PB81-857872 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Servomotors. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 63p

This bibliography contains information on ac, dc, and brushless servomotors applied to hydraulic presses, teleprinters, microprocessors, machine tools, sewing machines, and control devices. Reduction of vibration torque and minimum power consumption in servo-mechanism are also included. (Contains 54 citations, fully indexed and including a table of contents.)

PB81-857880 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Servomotors. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 156p

This bibliography contains worldwide information on ac, dc, and brushless servomotors applied to hydraulic presses, teleprinters, microprocessors, machine tools, sewing machines and control devices. Reduction of vibration torque and minimum power consumption in servo-mechanism are also included. (Contains 179 citations, fully indexed and including a table of contents.)

UCID-18871 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Review of Article, A Case for Submicrosecond Rise-Time Lightning Current Pulses for Use in Aircraft Induced-Coupling Studies, by D.W. Clifford, E.P. Krider and M.A. Uman.
H. S. Cabayan, and J. D. Zicker. 17 Jan 80, 14p
Contract W-7405-ENG-48

The amplitudes of currents due to lightning are considerably larger than NEMP induced currents both in the time and frequency domains. The more important quantity for aperture illumination is the rate of rise of the current. The analysis performed for this in this memorandum is unsatisfactory since the artificial double exponential model was used. Still, the lightning rate of rise is only twice as high as that due to NEMP even when the absolute worst (or presently known) lightning pulse is used. A much better way to do this comparison is to use an actual LEMP data and NEMP from an actual weapon. Furthermore, because of lack of data, no electric field analysis was undertaken. (ERA citation 06:006771)

9D. Information Theory

AD-A093 500/7 PC **A02**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Multicomponent Signals Based upon Quadratic Congruences.
Final rept.,
E. L. Titlebaum, and L. H. Sibul. 28 Oct 80, 24p
Rept no. ARL/PSU/TM-80-213
Contract N00024-79-C-6043

High efficiency, multicomponent signals for maximization to signal-to-noise ratio are investigated. Maximization of signal-to-noise ratio in colored noise requires control of volume distribution of the signal ambiguity function and transmission of unity efficiency signals. Signal efficiency is defined as the ratio of average power to the peak power. It is concluded that the signals must be frequency hop pulse trains. Quadratic congruences are chosen to place the components in time-frequency space. The number theoretic properties of these signals provide bound on the position and amplitude of the various peaks of the signal ambiguity function. The trade-offs are shown between volume removal, number of component signals, and the time-bandwidth product. (Author)

AD-A093 917/3 Not available NTIS
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Exact Maximum Likelihood Identification of ARMA Models: A Signal Processsing Perspective,
Claude Gueguen, and Louis L. Scharf. 1980, 12p
ARO-16437.5-EL
Contracts DAAG29-79-C-0176, N00014-75-C-0518
Availability: Pub. in Signal Processing: Theories and Applications, p759-769 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

9E. Subsystems

AD-A093 524/7 Not available NTIS
Mississippi Univ., University. Dept. of Electrical Engineering.
Analysis of a Wire Antenna in the Presence of a Body of Revolution,
Allen W. Glisson, and Chalmers M. Butler. 24 Oct 79, 7p ARO-14107.4-EL
Grant DAAG29-76-G-0285
Availability: Pub. in IEEE Transactions on Antennas and Propagation, vAP-28 n5 p604-609 Sep 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 656/7 PC **A02**/MF **A01**
Westinghouse Electric Corp., Baltimore, MD.
S-Band Solid State Transmitter.
Feb 80, 20p
Contract DAAG39-78-C-0148

Solid-state power generation techniques are presently available which allow for the generation of high peak power in the S-band frequency domain. Transmitters so configured would have inherent advantages of ruggedness, improved reliability, simpler modulation, and total use of low voltage supplies which would make it an excellent replacement for thermionic transmitters presently used.

AD-A093 720/1 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Deconvolution of Low Frequency Information from Signals Obtained with ac Coupled Sensors,
Stephan D. Price. 1980, 9p Rept no. AFGL-TR-81-0001
Pub. in SPIE, v264 p141-147 1980.

No abstract available.

AD-A093 810/0 PC **A04**/MF **A01**
Houston Univ., TX. Dept. of Electrical Engineering.
Studies of a Class of Low-Profile Antennas.
Final rept. 20 Sep 78-19 Sep 80,
Liang C. Shen, and Stuart A. Long. Dec 80, 71p
ARO-15407.9-EL
Contract DAAG29-79-C-0202, Grant DAAG29-78-G-0198

Printed-circuit or microstrip antennas have proven to be extremely useful in a wide variety of applications requiring radiators that are both low-profile and conformal. Previous theoretical investigations have relied on simple models, which provide very useful information, but are limited in their applicability and accuracy. During the present project a more rigorous theoretical approach has been developed. In addition a radiator with a new geometrical shape, that of an ellipse, has been investigated both theoretically and experimentally. The resulting antenna is able to provide circular polarization using only a single simple feed network.

AD-A093 843/1 PC **A03**/MF **A01**
Rockwell International, Thousand Oaks, CA. Science Center.
Numerical Methods for 2-Dimensional Modeling.
Semi-annual technical rept. 1 Jul-31 Dec 80,
W. D. Murphy, and W. F. Hall. Dec 80, 41p Rept no. SC5271.3SA
Contract MDA903-80-C-0498, DARPA Order-3984

Progress toward the development of a fast algorithm for two-dimensional computational modeling of VLSI fabrication processes is described. The first report of an algorithm producing two-dimensional dopant profiles in seconds per process step is presented. A summary of investigations to date and plans for future work are discussed. (Author)

AD-524 337/3 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Antenna System Gross Resistance Measurements at the Navy VLF Transmitting Station, Cutler, Maine.
Final rept. May-Oct 72,
John E. Raudenbush, and Edward E. Barr. Jan 73, 29p Rept no. NRL-MR-2545
Distribution limitation now removed.

Measurements of the antenna system total effective resistance (gross resistance) were conducted in May and October 1972, at the U.S. Navy VLF transmitting station (call letters NAA), Cutler, Maine. Measurements were made on the north antenna array before and after the annual summer maintenance period, and on the south antenna array following the maintenance period. The results do not show any significant overall change in the measured values of antenna system gross resistance following the maintenance period, although a slight reduction in gross resistance was observed at frequencies above 20 kHz. A comparison of these measurements was made with the 'Proof of Performance' measurements of antenna gross resistance conducted by Pickard and Burns, Inc., in 1961, and some sizeable differences in the measured values were noted. (Author)

N81-15196/1 PC **A05**/MF **A01**
Siemens A.G., Munich (Germany, F.R.).
Fabrication of Large Scale Integrated Circuits in I2l Technology.
Final rept.,
E. Wittenzellner. Dec 79, 85p BMFT-FB-T-79-116, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologia.

The integrated injection logic circuit technique (I sup 2 L), first demonstrated in 1972, was adapted and further developed to a production process utilizing standard bipolar processes. The three applications oriented variations developed were a standard I sup 2 L utilizing a Schottky TTL process, a fast I sup 2 L based on a modified ECL process, and a mixed I sup 2 L - linear using a 36 V process. These processes were used in the successful development of 7 LSI circuits, several of which were produced in sample quantities.

N81-15197/9 PC **A04**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Computer Assisted Circuit Design. Masks for the Production of Microwave Circuits Conception de Circuit Assistee Par Ordinateur Realisation de Masques pour l'Elaboration de Circuits Micro-Ondes.
J. L. Sedard. 1980, 62p CNES-NT-95
In French; English Summary.

Microwave circuit masks are made using high precision equipment which often is not absolutely essential. In fact, line width corresponding to a given impedance and line length corresponding to fractions of wavelengths are determined with an accuracy which is far lower than that of the apparatus used to produce the masks. From this standpoint, a computer and its graphical peripherals (cathode tracer COM 330) allow these difficulties to be overcome and a full scale to be produced directly on 35 mm film. These considerations are the basis of this study, including: the production and control of the definition tests, the trace program versus user data, applications and examples, and visualization.

N81-15198/7 PC **A02**/MF **A01**
Engins Matra, Velizy (France).
Flux Influence on Integrated Circuit Deterioration under Radiations Influence du Flux sur la Degradation des Circuits Integres Sous Radiations (Synthese).
E. Rabeyrin. 6 Aug 80, 10p DX-70/0.353
Text in French.

Tests conducted at 3 kRad/hours using a cobalt-60 source show no sensitivity of CMOS to radiant flux. Bipolar transistors showed a more important degradation at week flux which could be due to apparatus used in the experiment. A search of the literature revealed no significant effect of radiation flux on the degradation of integrated circuits.

N81-15199/5 PC **A02**/MF **A01**
Engins Matra, Velizy (France).
Gallium Arsenide for Integrated Circuits: State of Technology l'Arseniure de Gallium pour Circuits Integres: Etat de la Technologie.
E. Rabeyrin. 8 Sep 80, 14p DX-70/0.404
Text in French.

The fabrication of integrated circuits using gallium arsenides is complicated because this semiconductor is not oxygen stable and is dissolved at 350 C. Various technologies examined include those for MESFET, MOSFET, JFET, HJFET, and the FET-Schottky. Particular emphasis is given to the latter process in which generalized ion implantation, metallization, and photolithography are used. The electrical properties and reliability of gallium arsenide integrated circuits are also discussed.

N81-15459/3 PC **A05**/MF **A01**
Georgia Inst. of Tech., Atlanta. Electromagnetics Lab.
High Accuracy Radiation Efficiency Measurement Techniques.
Final rept.,
D. J. Kozakoff, and J. M. Schuchardt. Jan 81, 84p NASA-CR-3372, M-319
Contract NAS8-33605

The relatively large antenna subarrays (tens of meters) to be used in the Solar Power Satellite, and the desire to accurately quantify antenna performance, dictate the requirement for specialized measurement techniques. The error contributors associated with both far-field and near-field antenna measurement concepts were quantified. As a result, instrumentation configurations with measurement accuracy potential were identified. In every case, advances in the state of the art of associated electronics were found to be required. Relative cost trade-offs between a candidate far-field elevated antenna range and near-field facility were also performed.

PAT-APPL-6-076 644 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Apparatus for Controlling the Firing of Rectifiers in Polyphase Rectifying Circuits.
Patent Application,
R. J. Yarema. Filed 18 Sep 79, 10p
Contract EY-76-C-02-3000
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A polyphase rectifier is controlled with precision by a circuit that filters and shifts a reference signal associated with each phase and that starts a ramp signal at a zero crossing of the shifted reference signal. The difference between the ramp signal and an external trigger signal is used to generate a pulse that switches power rectifiers into conduction. The circuit reduces effects of variations that introduce subharmonics into a rectified signal and it can be used for constant or time-varying external trigger signals. (ERA citation 06:006407)

PB81-803132 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Radome Technology. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Feb 81, 161p
Supersedes PB80-801897, and NTIS/PS-78/1253.

Reports from worldwide research are cited on the use of composite materials, ceramic materials, plastics, dielectrics, and protective coatings for radomes. Research on the design, construction, and fabrication is included. Performance evaluations are presented which cover wave transmission, insertion loss, effect of antenna radiation patterns, rain erosion, and impact resistance. (This updated bibliography contains 154 citations, 20 of which are new entries to the previous edition.)

PB81-803140 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Radome Technology. December, 1976-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 76-Dec 80.
Feb 81, 154p
Supersedes PB80-801889, and NTIS/PS-78/1252. See also 1964-November, 1976, NTIS/PS-77/1151.

Reports from Federally-funded research are cited on the use of composite materials, ceramic materials, plastics, and protective coatings for radomes. Research on the design, construction, and manufacturing is included. Performance evaluations are presented which cover wave transmission, insertion loss, effect on antenna radiation patterns, rain erosion, and impact resistance. (This updated bibliography contains 147 citations, 16 of which are new entries to the previous edition.)

PB81-803496 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Satellite Antenna Technology. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.
Nov 80, 63p
Supersedes PB80-802689. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to articles from the international literature concerns satellite antenna technology. Topics stressed are antenna design studies dealing with antenna radiation patterns and antenna arrays. This bibliography excludes articles cited in the Communications Satellite Technology series (790332, 79033, 790334). (This updated bibliography contains 249 citations, 35 of which are new additions to the previous edition.)

10.

ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A093 456/2 PC **A04**/MF **A01**
Illinois State Geological Survey, Urbana.
The U.S. Energy Dilemma: The Gap between Today's Requirements and Tomorrow's Potential.
Environmental Geology Notes,
Hubert E. Risser. Jul 73, 67p Rept no. EGN-64

In the winter of 1972-1973, many individuals, government organizations, and business and industrial concerns in the United States were, for the first time, directly affected by the current energy dilemma. By the end of 1972, domestic output of both oil and natural gas had essentially reached the utmost productive capacity of the existing known reserves. Progress is being made in finding ways to produce liquid fuel and gas of pipeline quality from coal, recover oil from oil shale, and develop advanced nuclear reactors on a commercial basis. Progress also has been made in efforts to utilize energy from unconventional sources, among them geothermal, solar, and tidal sources. Some of these efforts will probably result in no more than limited contributions to our future energy supplies; others are likely to become major sources of supply. Ultimately, a combination of some of these various potential sources can be expected to provide the needed large additions to our energy supply, but none of them is now in a sufficiently advanced stage of development to offer significant relief for at least the next few years. Before the existing potential for energy can be realized, numerous economic, technologic, environmental, and resource problems that are currently impeding any immediate solution of the nation's energy dilemma must be overcome. This report identifies some of the factors contributing to the dilemma and discusses various aspects of proposals that have been offered as solutions to the problem.

AD-A093 757/3 PC **A03**/MF **A01**
Army Science Board, Washington, DC.
Army Science Board Ad Hoc Sub-Group Report on Energy Needs of the Army,
Harold M. Agnew, Robert A. Beaudet, Austin W. Betts, E. O. Hartis, and Wilson K. Talley. Oct 80, 26p

This study examined future Army requirements for energy and development programs to assist in meeting anticipated energy needs. Specific items reviewed include current and projected mobility, weapons system, and installation requirements for energy in the Army; identification of research and development efforts which might alleviate projected shortfalls. (Author)

ANL/CNSV-TM-43 PC **A06**/MF **A01**
Argonne National Lab., IL.
Community Energy Auditing: Experience with the Comprehensive Community Energy Management Program.
J. L. Moore, D. A. Berger, C. B. Rubin, P. A. Hutchinson, Sr., and H. M. Griggs. Sep 80, 107p
Contract W-31-109-ENG-38

The report provides local officials and staff with information on lessons from the audit, projection, and general planning experiences of the Comprehensive Community Energy Management Program (CCEMP) communities and provides ANL and US DOE with information useful to the further development of local energy management planning methods. In keeping with the objectives, the report is organized into the following sections: Section II presents the evaluation issues and key findings based on the communities' experiences from Spring of 1979 to approximately March of 1980; Section III gives an organized review of experience of communities in applying the detailed audit methodology for estimating current community energy consumption and projecting future consumption and supply; Section IV provides a preliminary assessment of how audit information is being used in other CCEMP tasks; Section V presents an organized review of preliminary lessons from development of the community planning processes; and Section VI provides preliminary conclusions on the audit and planning methodology. (ERA citation 06:002577)

BNL-51124 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Thin-Film Flat-Plate Solar Collectors for Low-Cost Manufacture and Installation.
J. W. Andrews, and W. G. Wilhelm. Mar 80, 37p
Contract AC02-76CH00016

A flat-plate solar energy collector design using thin-film plastics in both the absorber and glazing is described. The design approach proceeded in two steps. First, cost constraints on solar collectors were determined using reasonable economic projections. Second, engineering was applied only to those ideas which had hope of falling within those cost boundaries. The use of thin-film plastics appeared most attractive according to these criteria. The nature of the marketing and distribution network can be expected to have a strong impact on the final installed cost of the collector; the proposed design has characteristics which could make possible a reduced price markup. (ERA citation 06:005949)

CONF-801076-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Energy Use and Engineering Audits at State-Owned Facilities in Minnesota.
E. Hirst. 1980, 6p
Contract W-7405-ENG-26
World energy engineering congress, Atlanta, GA, USA, 15 Oct 1980.

The contents and results of two large computerized data bases maintained by the Minnesota De-

partment of Administration are described and analyzed. One contains information on monthly fuel use from 1972 through 1978 for 42 large state facilities: community colleges, state universities, hospitals, prisons, and office buildings. The second contains the results of detailed engineering audits performed at 41 such institutions. The audits cover 270 buildings and include 2010 individual energy conservation recommendations. Several data base management issues are discussed. These include errors and their identification, development of simple and consistent definitions for key terms, and collection of information on the major determinants of energy use and conservation potentials at these facilities. (ERA citation 06:002491)

DFE-23 PC **A04**/MF **A01**
Delegationen foer Energiforskning, Stockholm (Sweden).
Analysis and Evaluation of the Program for Wave Energy Conversion.
Jan 80, 52p
In Swedish.
U.S. Sales Only.

The Swedish R and D program for wave energy conversion is reviewed. The Swedish wave energy potential is low. Five TWh/year is a realistic estimate of the possible contribution from wave power. The author does not recommend an increased effort for wave power development in Sweden. (ERA citation 06:006000)

DOE/CS/10048-T1 PC **A04**/MF **A01**
Yale Univ., New Haven, CT.
US Solar Energy Policy for Less Developed Countries.
B. Russett. Oct 80, 55p
Contract AC02-79CS10048

By many different standards, solar energy is considered to be, at least potentially, a good thing. The assessment of its utility, however, typically is made on technical engineering grounds, or on economic standards of cost-effectiveness, without close attention to political and sociological implications of its use. While remaining sensitive to engineering and economic considerations, this report will concentrate on some political and sociological issues which will have great affect on decisions whether and how to make use of solar energy technology in less developed countries (LDCs). Only with an understanding of these issues - and with answers to some of the questions raised - can there be any serious effort to devise a satisfactory United States government policy for the promotion of solar energy applications abroad. This report, in the form of tentative propositions outlining issues about which further information is required, is based on the results of interviews in the United States, India and the Middle East, and an analysis of various reports by private individuals, national and transnational organizations, and government agencies. (ERA citation 06:002152)

DOE/CS/30169-4 PC **A02**/MF **A01**
Davis Alternative Technology Associates, CA.
Subcatcher Monitoring Project. Semi-Annual Technical Report, January-June 1980.
K. Treleven, and B. Maeda. 25 Oct 80, 20p
Contract FG02-79CS30169

The performance of the hardware and software of the data acquisition system was improved; better display methods were developed for the data collected; and the usual data collection and reduction methods were continued. A plotting program has been developed which takes the hourly data from CRUNCH, a program which holds the data for each channel in digital form. This plotting program, called PLTR5, allows the user to see temperature or radiation data for several channels and several days, all on one graph. The usual daily temperature, monthly temperature and load and performance data are included. PLTR5 graphs produced by a Calcomp plotter on the Burroughs B6700 are presented also. (ERA citation 06:005934)

DOE/CS/40081-T1 PC **A07**/MF **A01**
Georgia Inst. of Tech., Atlanta.
In-Plant Demonstration of Energy Optimization in Beck Dyeing of Carpet. Final Report, June 1, 1979-January 1, 1980.
W. C. Tincher. 1980, 130p
Contract AS05-76CS40081

Several energy-conservative technologies have been successfully combined and transferred to a commercial carpet finishing plant to optimize beck dyeing. The technology of bump-and-run, in which the dyebath temperature was allowed to drift for the last 85% of the hold time instead of being maintained by active steam sparging, reduced the energy consumption by 38% with negligible capital investment required. Merging of dyebath reuse with bump-and-run only marginally increased the energy consumption (to 39%), but substantially lowered the plant's finishing costs further by directly recycling dyes, auxiliary chemicals, and water. Final optimization, which merged a technique whereby the carpet was pulled directly from the hot bath with bump-and-run and dyebath reuse, further improved the economics by drastically reducing water/sewer requirements by 90% and eliminating the holding tank/pumping assembly as a reuse requirement. From a carpet industry viewpoint, the demonstrated modifications have a direct energy conservation potential of 2.4 x 10 exp 5 barrels of oil equivalent per year assuming the technology is directly transferable to similar atmospheric dyeing processes, e.g., beck dyeing of nylon and polyester fabrics, the potential to the entire textile industry is 2.6 x 10 exp 6 BOE/year. Economically, total potential savings for the carpet industry on reuse incorporation was $1.2 x 10 exp 7 /year, based on a 2.3 cents/lb. savings figure. When the allied fabric industry was included, the national potential was raised to $1.0 x 10 exp 8 / year. These figures include cost savings due to materials recycled (water, auxiliary chemicals and dyes) as well as energy conservation. (ERA citation 06:006204)

DOE/IR/10238-T1 PC **A02**/MF **A01**
Arizona Univ., Tucson. Dept. of Elementary Education.
DOE-University of Arizona Faculty Development Project. Final Report.
8 Sep 80, 21p
Contract FG01-79IR10238

The DOE-University of Arizona Faculty Development Project on Energy successfully completed a faculty development program. There were three phases of the program consisting of: a three week energy workshop for teachers, participation and cooperation with Students for Safe Energy in presentation of an Alternative Energy Festival at the University of Arizona, and workshops for teachers conducted at Flowing Wells School District. Each of these is described. Attendees are listed and a director's evaluation of the workshop is given. (ERA citation 06:002581)

DOE/NASA/CR-161202 PC **A03**/MF **A01**
Wormser Scientific Corp., Stamford, CT.
Design Data Brochure for a Pyramidal Optics Solar System.
Sep 80, 34p
Contract AI01-76CS31037

This Design Data Brochure provides information on a Pyramidal Optics Solar System for solar heating and domestic hot water. The system is made up of the collecting, storage, and distribution subsystems. Contained in the brochure are such items as system description, available accessories, installation arrangements, physical data, piping and wiring diagrams, and guide specifications. (ERA citation 06:002207)

DOE/OR/06028-T5 PC **A02**/MF **A01**
McDonnell Douglas Astronautics Co.-West, Huntington Beach, CA.
Development of a Prototype Heat Engine for Energy Conservation. Progress Report, April-June 1979.
W. S. Ginell. Jul 79, 16p
Contract AC05-78OR06028

The goals of this program are to produce a 1 hp Nitinol heat engine, to obtain a set of performance measurements over a range of operating conditions, and to establish design relations between performance and hardware configurature, engine dimensions, and Nitinol characteristics. During the preceding three month period, the engine module (MOD) and hysteresis brake control system were fabricated and Nitinol element conditioning studies were continued. Nitinol wire required for the module and for the engine has not yet been delivered. Conditioning studies have progressed to the point where bounding limits for several variable parameters have been identified. Within these limits, Nitinol elements have been mechanically and thermodynamically cycled to approx. 10 exp 5 cycles without failure. (ERA citation 06:005937)

DOE/OR/06028-T6 PC **A02**/MF **A01**
McDonnell Douglas Astronautics Co.-West, Huntington Beach, CA.
Development of a Prototype Heat Engine for Energy Conservation. Progress Report, October-December 1979.
W. S. Ginell. Jan 80, 9p
Contract AC05-78OR06028

The goals of this program are to produce a 1 hp Nitinol heat engine; to obtain a set of performance measurements over a range of operating conditions, and to establish design relations between performance and hardware configurature, engine dimensions, and Nitinol characteristics. During the preceding reporting period, the principal efforts were directed toward completion and initial operation of the Nitinol Engine Module (MOD). Diagnostic instrumentation was completed and a computerized data acquisition system was installed. Nitinol elements for MOD were conditioned and installed and the MOD was operated briefly. The first samples of Nitinol manufactured and processed at ORNL (Type 3) were characterized, and a second sample (Type 5) has been received. Sufficient quantities of Nitinol wire for full scale MOD operation and for the final engine are not yet available. (ERA citation 06:005938)

DOE/RA/29144-01 PC **A24**/MF **A01**
Oklahoma Univ., Norman.
Regional Power Systems Planning: A State of the ART Assessment. Final Report.
Oct 80, 564p
Contract AS05-77ET29144

The purpose of this report was to define regional power systems planning problems, the tools available and their shortcomings, and to document all of the above in a concise readable form. The approach consisted of a survey and literature search. The survey determined the tools being used by utilities, the tools they had rejected, and the tools they planned to try out. The literature search was conducted for the purpose of documenting the tools available, and performing a comparative analysis of these tools. The project included a mix of utility, university, and consulting organizations. Several organizations were consulted in the selection of the participants. A non-profit organization, The University of Oklahoma, was selected to manage the project. The results were reviewed in a series of four one day meetings by known authorities in each field. This report consists of the results of this project. Perhaps its major finding is that several aspects of the regional planning problem are not well defined, the roles of the various participants in regional planning is not clear, and certainly research is needed for the development of new methodology. (ERA citation 06:003774)

DOE/RG/10027-01 PC **A14**/MF **A01**
American Public Power Association, Washington, DC.
Home Audit Program: Management Manual.
Sep 80, 323p
Contract FG01-79RG10027

Many public power systems have initiated home energy audit programs in response to the requests of their consumers. The manual provides smaller public power systems with the information and specific skills needed to design and develop a program of residential energy audits. The program is based on the following precepts: locally owned public systems are the best, and in many cases the only agencies available to organize and coordinate energy conservation programs in many smaller communities; consumers' rights to energy conservation information and assistance should not hinge on the size of the utility that serves them; in the short run, public power systems of all sizes should offer residential energy conservation assistance to their consumers, because such assistance is desirable, necessary, and in the public interest; and in the long run, such programs will complement na-

tional energy goals and will produce economic benefits for both consumers and the public power system. A detailed description of home audit program planning, organization, and management are given. (ERA citation 06:002505)

DOE/R8/00516-T1 PC **A04**/MF **A01**
Denver Univ., CO.
Marketing: An Approach to Successful Energy-Conservation Information Programs.
R. B. Hutton, and D. L. McNeill. Aug 80, 58p
Contract AP48-80R800516

This monograph shows how the adoption of a marketing approach can improve the quality of the development and delivery of energy-conservation programs. Several factors make the use of such a marketing approach to conservation particularly beneficial, namely: (1) goals of conservation programs can be quantified (e.g., specified amount of energy to be saved); in addition, intermediate effects necessary for program success are also measureable (e.g., knowledge, attitude change, etc); (2) there is an apparent and increasing need for conservation by different parts (or sectors) of the population; however, it is clear that the desire for conservation is not the same for all sectors; (3) conservation programs can be thought of in much the same way as products with benefits and costs; this necessitates an understanding of how the population makes conservation decisions so that the program can fit into that decision process; (4) the need to tailor programs to the needs of the population is heightened by the general competition for the consumer dollar; it is necessary to design and present programs in a way that the individual will view conservation as an attractive choice among many (e.g., bank savings, buying clothes, furniture, car, etc.); and (5) the population's response to, and need for conservation is constantly changing; consequently, it is important to realize that these changes may need to be reflected in the conservation programs themselves (both ongoing and new). (ERA citation 06:003761)

NP-25194 PC **A03**/MF **A01**
Department of Industry, London (England).
Energy Use in the Miscellaneous Chemical Manufacturing Industries. Industrial Energy Thrift Scheme.
Feb 80, 33p
U.S. Sales Only.

An examination is made of the use of energy within the sector of industry defined under Other Chemical Industries, MLH 279, of the SIC. There are various types of manufacturing activity, classified in 7 groups, and these are polishes, adhesives and glues, explosives and fireworks, formulated pesticides, printing inks, surgical bandages, and photographic chemical materials. The total amount of energy used annually by the 61 factories visited was about 5400 TJ. Possible savings on the sites visited are estimated to be about 650 TJ or 12% of the total. The potential savings for the sector as a whole are estimated to be 1100 TJ in a year. Opportunities for improved use of energy lie in recovery of waste heat, better control of boiler plant, insulation of hot pipes, recovery of condensate, control of space heating, and saving electricity. (ERA citation 06:006208)

N81-15570/7 PC **A08**/MF **A01**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
System Study on the Possibilities of Intensified Use of Solar Energy in the Federal Republic of Germany (Frg).
Final rept.,
C. R. Bell, F. Jaeger, and W. Korzen. Dec 79, 156p BMFT-FB-T-79-100, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The state of the art of solar energy conversion technologies is analyzed in terms of technology assessment to identify possibilities of intensified use of solar options. It is deemed essential to identify and evaluate the criteria for large-scale application of solar technology, in particular the probable time phase in which it might be competitive and/or necessary to minimize the impact of the anticipated shortages of conventional energy sources. Four options for solar energy conversion were selected as being of specific interest: (1) low temperature system for space and water heating; (2) medium temperature systems for process heat; (3) high-temperature solar-thermal system; and (4) photovoltaic systems for electricity production. Energy storage alternatives were evaluated in connection with each of the concepts, to formulate economic viability of their future use. Performance and cost assessments of the contemporary developments were made to provide basis for projections, scenarios and market penetration criteria. Capital and energy payback estimates were made to develop visibility of the long-term potential of solar options. Low temperature systems offer the earliest potential, if further improvements and cost reduction are achieved.

ORNL/CON-55 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
State Energy Office Data Management: The Preliminary Energy Audit of the Institutional Buildings Grants Program.
J. L. Blue, P. B. Zuschneid, J. H. Carney, and E. Hirst. Oct 80, 50p
Contract W-7405-ENG-26

This report reviews state energy office (SEO) activities related to data collection, verification, and analysis for the preliminary energy audit portion of the Institutional Buildings Grant Program (IBGP). A preliminary energy audit (PEA), a collection of basic data on the characteristics of buildings and their energy use, was performed. Individual building energy use data were collected in the PEA program for thousands of institutions in each state. Such detailed data are potentially valuable in a number of ways: program management, program evaluation, policy analysis, and energy model development. However, such data must be consistently collected, carefully verified, and fully documented to fill these needs. Our examination of the SEO data management processes for the PEA showed problems in all these areas. Many SEOs lacked the time and staff to design a form adequately. This, in turn, influenced the clarity of and simplicity of the questionnaire, the ease of question interpretation, and, finally, the quality of responses. Confusion over the meaning of the federal regulations compounded these problems. Once the PEA data were collected, SEOs encountered problems in storing, verifying, and analyzing the data. Almost half the states did not computerize their PEA data and instead attempted manual control of a data set containing hundreds of thousands of data elements. Data verification and analysis in these states have been limited. Even among those SEOs with computerized data files, the computer and staff time necessary for adequate verification and analysis of the PEA data has rarely been available. Cross-comparison among states was facilitated by development of a procedure to rank PEA processes. It appears that the most important determinant of a good PEA process is the presence of a highly motivated, well-trained staff. (ERA citation 06:002514)

ORNL/TM-7553 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of a Corroded Stainless Steel Recuperator Used on a Glass Melting Furnace.
J. I. Federer, and V. J. Tennery. Nov 80, 29p
Contract W-7405-ENG-26

A recuperator installed on a natural gas-fired glass melting furnace recovered heat from flue gases to preheat combustion air for the gas burner. The recuperator, which was constructed of type 321 stainless steel, supplied combustion air at about 500 exp 0 C for about 5760 h (eight months). Although some corrosion of the partition wall in contact with the flue gases was noted during the early weeks of operation, the recuperator continued to supply preheated air at near design temperature throughout the campaign. The partition wall had a 1.5-mm-thick corrosion product consisting of oxides and possible sulfides, and the alloy exhibited a region of grain boundary attack. The thickness of the corrosion product far exceeded that predicted by assuming that only oxidation occurred at the indicated temperature of 650 exp 0 C. It was concluded that accelerated corrosion was caused by a sulfidation-oxidation mechanism resulting from carry-over of a sulfur-bearing compound from the glass batch and the fuel. (ERA citation 06:006209)

PB81-147290 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Solar Energy Systems - Standards for Cover Plates for Flat Plate Solar Collectors.
Final rept.,
Elizabeth J. Clark, Willard E. Roberts, John W. Grimes, and Edward J. Embree. Dec 80, 161p NBS-TN-1132
Sponsored in part by Department of Energy, Washington, DC.

Laboratory studies were performed to obtain data needed for the development of standards to evaluate the performance and durability of cover plates for flat plate solar collectors used in solar heating and cooling systems. Ten cover plate materials were evaluated to assess their durability after exposure to heat aging, natural weathering and accelerated weathering. Laboratory tests included measurement of solar energy transmittance, linear dimensional stability, warpage and the effect of the dirt retention. The temperatures cover plate materials attain on solar collectors were determined by measurement and by computer simulations. A procedure was developed for the natural weathering exposure of cover plate materials at elevated temperatures which approximate stagnation conditions of solar collectors. The results of the laboratory tests are presented and draft standards for evaluating cover plate materials for flat plate solar collectors are proposed.

PB81-148520 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Biomass Pyrolysis/Gasification Bibliography (Bibliographie Pyrolyse et Gazeification de la Biomasse).
Review rept.,
R. Graham. 1980, 23p RR-502EF
Also pub. as ISSN-0709-4523. Summary in English and French.

This bibliography covers a variety of topics relating directly and indirectly to biomass gasification. Direct topics include pyrolysis/gasification chemistry, fundamental research papers, process development, state-of-the-art engineering studies, economic analysis, and general theory. Indirectly related topics include catalysis, fluidization, gas purification, energy farming, industrial applications for producer gas, combustion, hydrogenation, digestion, and biomass potential.

PB81-153926 PC **A11**/MF **A01**
Hoffman-Muntner Corp., Silver Spring, MD.
Environmental, Operational, and Economic Aspects of Thirteen Selected Energy Technologies,
Lawrence Hoffman, Stephen E. Noren, and Elmer C. Holt, Jr. Sep 80, 243p EPA-600/7-80-173
Contract EPA-68-01-4999

This report covers the environmental, operational, and economic aspects of thirteen (13) current and developing technologies as applied to the generation of electric power, steam generation, and the conversion of fossil energy into alternative foorms. The following technologies are addressed: (1) Conventional Boildr; (2) Diesel Engine; (3) Fluidized-Bed Combustion; (4) Combined Cycle Systems; (5) Low/Medium-Btu Gasification; (6) Chemically Active Fluid Bed; (7) Indirect Coal Liquefaction; (8) High-Btu Gasification; (9) Surface Shale Oil Processing; (10 In situ Shale Oil Processing; (11) Direct Coal Liquefaction; (12) Fuel Cells; and (13) Magnetohydrodynamic (MHD). The present status of each technology is discussed along with prospects for commercial implementation.

PB81-803652 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Distillation. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 123p
Supersedes PB80-804099, and NTIS/PS-79/0033.

Feasibility, design, and construction of solar stills are discussed in abstracts of reports from worldwide literature. Most abstracts deal with the con-

struction of solar stills for the desalination of sea water; a few abstracts pertain to thermodynamic analyses, agricultural uses, and providing potable water for isolated residences of small communities. Experience with the use of solar stills in various countries is covered. (This updated bibliography contains 128 citations, 11 of which are new entries to the previous edition.)

PNL-3402 PC **A04**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Public Attitudes Toward Risk Tradeoffs in Energy Policy Choices. Final Report.
M. K. Lindell, and T. C. Earle. Jun 80, 51p B-HARC-411/80/025
Contract AC06-76RL01830

The emphasis that will be placed on each of a number of energy policy alternatives will be determined by the tradeoffs among many factors. Important among these factors are public preferences for different levels of power availability and risk to health and safety. Also important in determining support for energy alternatives is public perception of the consequences of those policies. To assess public perception and evaluation of these factors, a number of respondents were selected to answer questions about these issues. Respondents' judgements of the acceptability of thirty-six hypothetical energy policies were analyzed using two complementary methods, discriminant analysis and judgement analysis. The first method is a statistical procedure that examines how well task variables discriminate among groups of respondents. The second method is a procedure which is used to construct models that describe the judgement processes used by respondents. Results of the discriminant analysis showed that differences among respondents' judgements were strongly related to the TECH dimension but only weakly affected by RISK and PA. On the TECH dimension, antinuclear respondents indicated relative acceptance of conservation and solar and relative rejection of nuclear and coal. Although pronuclear respondents showed slightly greater support of nuclear and coal than conservation and solar. The six clusters differed most strongly on nuclear, followed by conservation and solar, then coal. The PA dimension had more effect on the judgements of pronuclear respondents than on the judgements of antinuclear respondents. The analysis of the data indicated that the judgements of pro- and antinuclear respondents were better fit by separate models. The antinuclear respondents placed a slightly greater weight on the more RISK part of the RISK dimension relative to the PA dimension. (ERA citation 06:002416)

SERI/TR-631-544 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Omnium-G Parabolic Dish Optical Efficiency: A Comparison of Two Independent Measurement Techniques.
M. Bohn, and H. Gaul. Oct 80, 16p
Contract AC02-77CH00178

Measurements made at SERI of the optical efficiency of the Omnium-G parabolic dish concentrator are described. Two independent techniques were used: the cold-water calorimeter method and the heat of fusion method. Results from both techniques agree quite well and indicate that the optical efficiency for a 10-cm receiver aperture is 25%. Optical efficiency measured in early 1979 was 37%, and in mid 1979 it had degraded to 21%. An optical alignment procedure is described that resulted in the increase in optical efficiency from 21% to the current value of 25%. (ERA citation 06:005952)

SIB-R-15-1980 PC **A05**/MF **A01**
Swedish Council for Building Research, Stockholm.
Heat Recovery from Electric Arc Furnaces and Continuous Casting Plants for Industrial and Municipal Heating Systems.
A. Halldin, B. Persson, and H. Wahlberg. 1980, 78p
In Swedish.
U.S. Sales Only.

No abstract available.

STU-I-174-1980 PC **A04**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Energy Use in Pulp and Paper Industry.
J. Fors, and B. Nord. 1980, 53p
In Swedish.
U.S. Sales Only.

The report describes the energy use at the SCA kraft liner plant in Munksund, Sweden. The energy balances of the processes are described in Sankay diagrams and the energy flow of the entire plant is discussed. Seasonal differences are treated and the energy quality required for individual steam processes are pointed out. (ERA citation 06:006211)

UCID-18815 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
French, German, and Israeli Solar Activity in Mexico.
D. W. Dorn. 8 Oct 80, 10p
Contract W-7405-ENG-48

Both France and, more recently, the Federal Republic of Germany are very supportive of Mexico's interest in the direct use of solar energy. The French have long emphasized solar water-pumping for remote sites, and many of their installations have been at the nominal 1-kW level appropriate for small villages and limited irrigation. More recently, however, they have installed a 30-kW system at San Luis de la Paz. While costs for these systems have been high (US $10,000 for the 1 kW system and US $500,000 for the 30-kW system), they are expected to decline with mass production. The Germans have, for remote villages, stressed integrated systems that can pump and desalinate water, generate electricity for local use, and supply mechanical power. The total cost of the joint Mexican/German SONNTLAN project is estimated at about US $22 million. Israel is just beginning to make arrangements with Mexico for joint, long-term research projects in solar energy. (ERA citation 06:002199)

UCRL-52938 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Wind-Power Site-Screening Methodology. Final Report.
J. J. Walton, C. A. Sherman, and J. B. Knox. Oct 80, 67p
Contract W-7405-ENG-48

In 1975, the Energy Research and Development Administration (ERDA) requested that the Lawrence Livermore Laboratory develop, validate, and demonstrate a wind-energy site-screening methodology suitable for defining the location, geographic extent, and strength of the resource. The appropriate core capabilities existing at that time, namely principal-components analysis techniques for classifying types of regional flow fields and a three-dimensional diagnostic flow model were blended into a rationale for screening wind sites in the presence of complex terrain. This report describes the relevant contributing capabilities, the developed screening methodology, the prospectors' preliminary wind-resource maps for the island of Oahu - generated to guide the development of the observational network, and the data base developed for testing. It also illustrates the use of the methodology on the island of Oahu and describes two annual assessments of Oahu's wind-energy potential. (ERA citation 06:006003)

10B. Power Sources

CONF-801203-4 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Small Scale Hydroelectric Development and the Environment: Issues, Challenge, and Opportunity.
S. G. Hildebrand. 1980, 2p
Contract W-7405-ENG-26
National conference on renewable energy technologies, Honolulu, HI, USA, 7 Dec 1980.

A small scale hydroelectric (SSH) facility is defined as an existing dam that can be retrofitted to produce 25 MW or less capacity. An estimate of the total SSH potential in the United States indicates there are 4979 sites with 8775 MW capacity and 25,126 GWh average annual energy. This represents approximately 1% of existing total installed electrical capacity from all sources in the US. Some of the major environmental issues that must be analyzed to determine potential for adverse impact at SSH sites include dredging, fish passage, water level fluctuation, and instream (minimum) flow. Each of these issues is discussed. It is concluded that development of the SSH resource represents a good energy investment and that the attributes of renewable energy and the emphasis on existing dams as opposed to new dam construction are positive features from the environmental standpoint. (ERA citation 06:005875)

DOE/CS/56604-T1 PC **A06**/MF **A01**
Texas A and M Univ., College Station. Dept. of Mechanical Engineering.
Technical and Economic Feasibility of a Thermal Gradient Utilization Cycle (TGUC) Power Plant. Final Report.
A. M. Raiji, D. A. Renfroe, and T. R. Lalk. 1980, 115p
Contract FG01-78CS56604

The technical and economic feasibility of a Thermal Gradient Utilization Cycle (TGUC), a new concept in power generation, was investigated. Power is generated by exploiting the natural atmospheric temperature gradient. A low grade energy source is used to vaporize a fluid which rises in a pipe to a higher elevation where it is condensed. The cycle is completed by passing the condensed liquid through a turbine as it returns to the lower elevation. A digital computer model was developed and used to simulate the operation of the cycle and to conduct a parameteric study. Life cycle cost analysis and energy analyses were conducted for the specific case of a TGUC using the ambient air at the lower elevation as an energy source. Although the cycle has a low thermal efficiency and is site specific, it is technically feasible. Variations in mass flow rate of the working fluid and elevation were found to affect the cycle power output to a large extent. The investment cost of a hypothetical 10 megawatt TGUC power plant was determined to be $3,080 per kilowatt, with life cycle busbar costs of electricity ranging from 47 to 55 Mills per kilowatt-hour depending on the method of financing. Results of the energy analyses showed that a TGUC system would have a positive net energy and a second law efficiency of 23% for the case of a TGUC system using the atmosphere as an energy source. (ERA citation 06:006018)

DOE/ET/15422-5 PC **A21**/MF **A01**
ENCOTH Corp., Princeton, NJ.
Advanced Theoretical Methods for Improving the Performance of Thermionic Converters. Final Report, February 13, 1979-August 12, 1980.
1980, 500p
Contract AC02-79ET15422

Separate abstracts were prepared for the 17 papers included. (ERA citation 06:006166)

DOE/JPL/955217-80/5 PC **A04**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Development of High Efficiency (14%) Solar Cell Array Module. Final Report, November 1979-June 1980.
P. A. Iles, S. Khemthong, S. Olah, W. J. Sampson, and K. S. Ling. 1980, 61p
Contract NAS-7-100-955217

More effort was concentrated on development of procedures to provide large area (3 in. dia) high efficiency (16.5% AM1, 28 exp 0 C) P+NN+ solar cells. Intensive tests with 3 in. slices gave consistently lower efficiency (13.5%). The problems were identified as incomplete formation of an optimum back surface field (BSF), and interaction of the BSF process and the shallow P+ junction. The problem was shown not to be caused by reduced quality of silicon near the edges of the larger slices. A promising process sequence was identified. A reasonably large number of fairly efficient (13.5% average) 3 in. P+NN+ cells were made and combined with no problems with the module design developed for this project. In the module,

one hundred and twenty (120) cells were connected, eight (8) in parallel and fifteen (15) in series. Six (6) modules were delivered with an average power output (per total module area of 6890 cm exp 2) of 75.3 watts and a module overall average efficiency of 10.9%. (ERA citation 06:005897)

DOE/NASA/0089-80/1 PC **A14**/MF **A01**
Mathtech, Inc., Arlington, VA.
Study of Fuel Cell on-Site, Integrated Energy Systems in Residential/Commercial Applications.
R. A. Wakefield, S. Karamchetty, R. H. Rand, W. S. Ku, and V. Tekumalla. Oct 80, 304p NASA-CR-165144
Contract AI01-77ET11272

An assessment of the economic and energy use implications of employing phosphoric acid fuel cells in on-site, integrated energy systems (OS/IES) for residential and commercial buildings is described. The study differs in several respects from past investigations of fuel cell OS/IES (for buildings) in that: (1) it is not an evaluation of any specific fuel cell, but a comparative assessment of three alternative fuel cell designs that are presently being considered for commercial development; (2) the conventional building energy systems were specified by an architect and engineering firm that routinely designs such systems; and (3) it was required that all fuel cell systems provide electric service at a reliability equivalent to that of a typical electric utility. Three building applications were selected for a detailed study: a low-rise apartment building; a retail store, and a hospital. Building design data were than specified for each application, based on the design and construction of typical, actual buildings. Finally, a computerized building loads analysis program was used to estimate hourly, end-use load profiles for each building in each of three locations: Washington, DC; Chicago, Illinois; and Dallas, Texas. It was concluded that fuel cell OS/IES's are: clearly economic (from a life-cycle cost standpoint) when used in hospitals; marginally economic when employed in retail stores; and generally not economic when used in small apartment buildings. All three applications resulted in energy consumptions savings of from ten to fifty percent. Additional analyses also were conducted to assess the impacts of: a tie-in with electric utility grid, both with and without sales to the grid, the use of thermal storage; and the effects of varying certain key assumptions. (ERA citation 06:006184)

DOE/NASA/0107-2 PC **A11**/MF **A01**
Burns and Roe, Inc., Woodbury, NY.
Modification of the ECAS Reference Steam Power Generating Plant to Comply with the EPA June 1979 New Source Performance Standards.
S. A. Fogelson, I. L. Chait, W. J. Bradley, and W. Benson. Aug 80, 247p
Contract AI01-77ET10769

This report presents the results of a study carried out to modify the conceptual design and performance of the reference coal-fired, conventional furnace electric power generating plant with wet lime sulfur dioxide scrubber, developed during the Energy Conversion Alternatives Study (ECAS), to comply with the New Source Performance Standards (NSPS), promulgated by the US EPA in June 1979. It also presents detailed capital cost estimates for the ECAS and modified reference plants in mid-1978 dollars for both 250 exp 0 and 175 exp 0 F (394 exp 0 and 353 exp 0 K) stack gas reheat temperatures based on the cost estimates developed for the ECAS study. Information is included on: technical assessments of the design and performance of the scrubber system; determination of the design changes required for the ECAS reference plant to meet the June 1979 NSPS, modification of the ECAS design appropriately, and side-by-side comparison of the characteristics and costs of the modified and unmodified components; update of the ECAS reference plant detailed capital cost estimates presented in the ECAS study from mid-1975 to mid-1978; and development of detailed capital cost estimates for the modified reference plant, based on the costs of the ECAS reference plant. (ERA citation 06:006021)

DOE/RA-0055 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Hydroelectric Resource Development Div.
Federal Financial Assistance for Hydroelectric Power.
Sep 80, 6p

The Rural Energy Initiative seeks to maximize the effectiveness of Federal programs in developing certain energy resources, including small-scale hydropower. The REI target is to arrange financing for 100 hydro sites by 1981, with about 300 MWe of additional capacity. The REI financial assistance programs for small hydropower development in the US DOE; Economic Development Administration; REA; HUD; Farmers Home Administration; DOI; DOL's CETA programs; and the Community Services Administration are described. (ERA citation 06:003585)

FE-2468-63 PC **A06**/MF **A01**
Engineering Societies Commission on Energy, Inc., Washington, DC.
Regional Conversion to Coal. Final Report.
M. L. McKimmey. Mar 80, 119p
Contract EF-77-C-01-2468-007

This report describes an investigation of powerplant coal conversion, and the options and problems confronting a group of electric utility companies in an example region. The region selected for the study is New England, but the analysis format is valid for other regions having different specific conditions but facing the same general conversion mandates. The report concludes that: (1) Because of its physical characteristics, simple conversion to coal of a utility steam boiler unit designed for oil or gas is not feasible. Boiler replacement of pre-boiler coal liquefaction or gasification would be required to make the conversion to coal. (2) Coal-oil mixture combustion is a promising concept for the partial displacement of oil that could have significant application in New England. (3) Coal-derived synthetic boiler fuels, primarily liquids, could play a significant role in the conversion of existing units, but their availability in sufficient quantities by 1990 is doubtful. (4) The region's indigenous coal and hydropower resources are not expected to impact the energy mix by 1990, if ever. (5) The mediation process conducted for the Brayton Point plant is exemplary and should be encouraged in other coal conversion efforts. Responsible environmental compromise, brought about by negotiations conducted in a spirit of cooperation, provided the catalyst for that conversion project and can do the same for others. (6) The coal conversion scenario outlined in this study describes one approach by which utility oil consumption could be reduced by about 35 million barrels per year by the year 1990. This scenario, one of many which could be theorized, could cost electric utility customers some 1 billion dollars (1980 dollars) and will have severe effects on the region's electric system reliability. (ERA citation 06:006026)

INIS-mf-5694 PC **A06**/MF **A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Power Generation Costs Coal - Nuclear Power. Comparing Investment and Operating Costs of Coal-Fired and Nuclear Power Plants. Text Volume.
1979, 101p
In German.
U.S. Sales Only.

In the discussion on the necessity of nuclear power, even exports have disagreed on the costs of power generation in nuclear and coal-fired power plants. To clear up this problem, the Battelle-Institut e.V., Frankfurt has, in 1976, been charged with the task to carry out a study titled 'Comparison of Investment and Operating Costs of Coal-fired and Nuclear Power Plants.' An 'Estimate of Direct and Indirect Costs of Power Generation in Coal-fired and Nuclear Power Plants until 1990' was to be set up. The characteristic cost factors of these types of power plant were to be explained for a comparison of development trends, and alternative cost calculations were to be carried out. The study has been designed as a 'parameter study' by the Battelle-Institut, and a variable computer program has been developed which permits alternative calculations for desired parameter constellations. Starting from the given 'basic' types of power plant, a variety of alternative types has been taken into account. (orig./UA) 891 UA/orig.- 892 AMO. (Atomindex citation 11:529060)

NP-25187(V.1) PC **A09**/MF **A01**
Acres Shawinigan Ltd., Toronto (Ontario).
Study of the Potential for Cogeneration in Canada: Industrial Steam Turbines. Volume I. Main Report.
Dec 79, 196p
U.S. Sales Only.

Results of a study to determine the potential for cogeneration in Canada are presented. National, provincial, and industrial potentials for cogeneration based on responses to a questionnaire from 211 plants operating boiler plants are developed. Each of the 211 plants were subjected to a common analysis procedure to determine cogeneration capability and cost. The study defined cogeneration, and addressed the technical potential for cogeneration, the economic implications of cogeneration, and the institutional barriers which have to be overcome before cogeneration is fully accepted as an energy supply option in Canada. (ERA citation 06:005012)

NP-25187(V.2) PC **A12**/MF **A01**
Acres Shawinigan Ltd., Toronto (Ontario).
Study of the Potential for Cogeneration in Canada: Industrial Steam Turbines. Volume II. Economic Potential.
Dec 79, 268p
U.S. Sales Only.

The economic potential, with the identification of the technical possibilities that could prove to be economically viable, for industrial co-generation is discussed. The study takes the point of view of society as a whole and concentrates on what may be thought of as the direct production costs of electric power generation. These are the elements of cost that would fall within the purview of an accountant and it omits the opportunity costs of non-market elements. Calculation methods and results of the social savings and price scenarios are presented. Specifically, information on the economic potential of co-generation in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia is detailed. (ERA citation 06:005013)

N81-14985/8 PC **A04**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
The Velocity Induced by the Wake of a Wind Turbine in a Shear Layer, Including Ground Effect.
B. C. A. Johansson. 17 Sep 80, 51p FFA-TN-HU-2189-PT-3, ISSN-0081-5640
Contract NE-5061-013

The turbine was approximated by a disk area of continuous distributions of thrust and force parallel to the disk plane. Its wake was represented by a semi-infinite cylinder of distributed vorticity. A numerical example was calculated. The theory is based upon assumptions strictly valid only for small perturbations of the undisturbed flow. However, the results may have a wider range of applicability.

N81-14989/0 PC **A02**/MF **A01**
Ohio Univ., Athens. Avionics Engineering Center.
Dc-to-DC Power Supply for Light Aircraft Flight Testing.
S. R. Yost. Dec 80, 7p NASA-CR-163850, TM-76
Contract NGR-39-009-017

The power supply unit was developed to serve as the power source for a loran-C receiver. The power supply can be connected directly to the aircraft's electrical system, and is compatible with either 14 or 28 volt electrical systems. Design specifications are presented for the unit along with a description of the circuit design.

N81-15461/9 PC **A07**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Study of Component Technologies for Fuel Cell on-Site Integrated Energy Systems.
Final rept.,
W. D. Lee, and S. Mathias. Dec 80, 129p NASA-CR-165152-V-1, DOE/NASA/0121-80/1-V-1

Contracts DEN3-121, DE-AI03-80ET-11272

Heating, ventilation and air conditioning equipment are integrated with three types of fuel cells. System design and computer simulations are developed to utilize the thermal energy discharge of the fuel in the most cost effective manner. The fuel provides all of the electric needs and a loss of load probability analysis is used to ensure adequate power plant reliability. Equipment cost is estimated for each of the systems analyzed. A levelized annual cost reflecting owning and operating costs including the cost of money was used to select the most promising integrated system configurations. Cash flows are presented for the most promising 16 systems. Several systems for the 96 unit apartment complex (a retail store was also studied) were cost competitive with both gas and electric based conventional systems. Thermal storage is shown to be beneficial and the optimum absorption chiller sizing (waste heat recovery) in connection with electric chillers are developed. Battery storage was analyzed since the system is not electric grid connected. Advanced absorption chillers were analyzed as well. Recommendations covering financing, technical development, and policy issues are given to accelerate the commercialization of the fuel cell for on-site power generation in buildings.

N81-15462/7 PC **A07**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Study of Component Technologies for Fuel Cell on-Site Integrated Energy System. Volume 2: Appendices.
Final rept.,
W. D. Lee, and S. Mathias. Dec 80, 143p NASA-CR-165152-V-2, DOE/NASA/0121-80/1-V-2
Contracts DEN3-121, DE-AI03-80ET-11272

This data base catalogue was compiled in order to facilitate the analysis of various on site integrated energy system with fuel cell power plants. The catalogue is divided into two sections. The first characterizes individual components in terms of their performance profiles as a function of design parameters. The second characterizes total heating and cooling systems in terms of energy output as a function of input and control variables. The integrated fuel cell systems diagrams and the computer analysis of systems are included as well as the cash flows series for baseline systems.

N81-15463/5 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Gaas Shallow-Homojunction Solar Cells.
Final rept.,
J. C. Fan. 30 Jun 80, 29p NASA-CR-165167
NASA ORDER C-30969-D

With the objective of demonstrating the feasibility of fabricating 2 x 2 cm efficient, shallow homojunction GaAs solar cells for space applications, this program addresses the basic problems of material preparation and device fabrication. Significant progress was made and conversion efficiencies close to 16 percent at AM0 were obtained on 2 x 2 cm cells. Measurements and computer analyses on the n(+)/p/p(+) shallow homojunction cells indicate that such cell configuration should be very resistant to 1 MeV electron irradiation.

N81-15467/6 PC **A04**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Statik und Dynamik der Luft- und Raumfahrtkonstruktionen.
Rotor Model for Verification of Computation Methods Rotormodell Zur Verifizierung von Rechenverfahren.
J. H. Argyris, W. Aicher, F. Karl, W. Kuemmerle, and M. Mueller. 1979, 58p ISD-262, ISSN-0170-6071
Contract BMFT-ET-4086-A
In German; English Summary.

In order to prove the quality of idealization and the validity of computation for windmills, a driven model of a windmill with a 7.4 m diameter rotor was constructed. New data acquisition and data transmission systems with 16 channels and digitization in the rotating system were developed and tested. The dynamic response of the rotor blades to the cyclic loading of gravity was taken to compare measurements and computations. For the measurements and evaluation which were performed by a measurement system and a computer, the necessary software was built.

PATENT-4 204 882
Not available NTIS
Department of Energy, Washington, DC.
Thermocouple Split Follower.
Patent,
L. J. Howell. Filed 3 Dec 65, patented 27 May 80, 8p PAT-APPL-512 824
Supersedes PAT-APPL-512 824-65.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington DC 20231 $0.50.

Thermoelectric generator assembly is provided accommodating differential thermal expansion between thermoelectric elements by means of a cylindrical split follower forming a slot and having internal spring loaded wedges that permit the split follower to open and close across the slot. (ERA citation 06:004610)

PB81-803447 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Optical Coatings for Solar Cells and Solar Collectors. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 304p
Supersedes PB80-803794, and NTIS/PS-78/1342.

This bibliography of worldwide journal literature cites reports on materials and research for the development of selective coatings for solar energy conversion devices. These materials include types of coatings or covers used to reflect or transmit solar radiation in order to optimize solar conversion to heat or electricity. Most studies concern anti-reflection, thermal control, or reflective coatings. Coatings which act as optical filters are also covered. (This updated bibliography contains 296 citations, 73 of which are new entries to the previous edition.)

PB81-803454 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Optical Coatings for Solar Cells and Solar Collectors. 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1979-Jan 81.
Feb 81, 97p
Supersedes PB80-803786, and NTIS/PS-78/1341. See also 1964-1978, PB80-803778.

Materials and research for the development of selective coatings for solar energy conversion devices are described in these citations. These materials include types of coatings or covers used to reflect or transmit solar radiation in order to optimize solar conversion to heat or electricity. Most studies concern antireflection, thermal control, or reflective coatings. Coatings which act as optical filters are also covered. (This updated bibliography contains 89 citations, 49 of which are new entries to the previous edition.)

PNL-3401 PC **A04**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Social Issues and Energy Alternatives: The Context of Conflict over Nuclear Waste. Final Report.
M. K. Lindell, T. C. Earle, and R. W. Perry. Jun 80, 67p B-HARC-411/80/033
Contract AC06-76RL01830

The perceived risks and benefits of electric power alternatives were used to explore the context of attitudes toward nuclear power. Supporters and opponents of nuclear power responded to thirty-three items which referred to five categories of energy issue: the production potential of electric, risks of those technologies, power generation technologies, energy conservation, comparisons of risks among technologies and comparisons between risks and benefits of each technology. The results are summarized. The nuclear supporters studied here do favor nuclear power. However, they believe that there are limited prospects for contributions from solar, wind and hydroelectric technologies. They also believe that there are serious disadvantages to conservation. Nuclear opponents, on the other hand, disagree that there are such limited prospects for solar and wind, although they are neutral on the prospects for increased hydro capacity. They also do not believe that conservation necessarily poses serious adverse consequences either for themselves or others. (ERA citation 06:004957)

SERI/PR-8104-2-T3 PC **A03**/MF **A01**
Johnson Controls, Inc., Milwaukee, WI.
Commercialization of a Thick Film Solar Cell. Quarterly Technical Progress Report, September 1, 1980 to October 1, 1980.
G. D. McDonald. 1980, 29p
Contract AC02-77CH00178

Films of CdS were prepared by screen printing and were sintered using a variety of firing conditions and flux concentrations. At the higher temperatures, longer firing temperatures, and lower flux concentrations crystals of cadmium oxide formed on the surface of the CdS film. Preparation of the copper sulfide barrier via the aqueous solution treatment was found to produce suitable barriers only when the films were pre-etched in HCl and when the dip solution containing Cu sub 2 Cl sub 2 was hot. CdS films formed on indium oxide coated glass showed no evidence of indium penetration into the CdS layer. Transmission studies of the CdS layer failed because of the opacity of the films relative to the equipment available. (ERA citation 06:005915)

SERI/PR-8143-1-T2 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Development of Copper Sulfide/Cadmium Sulfide Thin Film Solar Cells. Third Technical Progress Report, 13 January-12 April 1980.
J. R. Szedon, F. A. Shirland, J. A. Stoll, H. C. Dickey, and W. J. Biter. 23 Jul 80, 39p
Contract AC02-77CH00178

During the course of this quarter, peak cell performance has been improved from 0.455V to 0.510V, from 11.8 to 20.2 mA/cm exp 2 and from 3.3% to 6.5% as regards open circuit voltage, short circuit current density and conversion efficiency, respectively. Information exchanges and critical reviews of process details have been made with the cooperation of the group at the Institute of Energy Conversion, University of Delaware. As a result of these, two areas were identified which lead to higher cell performance. Substrate temperature control and monitoring to higher cell performance. Substrate temperature control and monitoring during deposition were improved by the use of a thermocouple welded to the foil substrate. Fast, thorough rinsing of the CdS films in the interval between the etch for surface texturing and the immersion in cuprous chloride for barrier formation resulted in less reflective surfaces, and simultaneously high short circuit current and open circuit voltage performance. (ERA citation 06:005916)

SERI/PR-8277-1-T1 PC **A03**/MF **A01**
Motorola, Inc., Phoenix, AZ.
Thin Film Polycrystalline Silicon Solar Cells. Quarterly Technical Progress Report No. 3, 1 April 1980-30 June 1980.
K. R. Sarma, M. J. Rice, R. Legge, and R. J. Ellis. Jun 80, 49p
Contract AC02-77CH00178

During this third quarter of the program, the high pressure plasma (hpp) deposition process has been thoroughly evaluated using SiHCl sub 3 and SiCl sub 4 silicon source gases, by the gas chromatographic analysis of the effluent gases from the reactor. Both the deposition efficiency and reactor throughput rate were found to be consistently higher for hpp mode of operation compared to conventional CVD mode. The figure of merit for various chlorosilanes as a silicon source gas for hpp deposition is discussed. A new continuous silicon film deposition scheme is developed, and system design is initiated. This new system employs gas interlocks and eliminates the need for gas curtains which have been found to be problematic. Solar cells (2 cm x 2 cm area) with AM1 efficiencies of up to 12% were fabricated on RTR

grain enhanced hpp deposited films. The parameters of a 12% cell under simulated AM1 illumination were: V/sub OC/ = 0.582 volts, J/sub SC/ = 28.3 mA/cm exp 2 and F.F. = 73.0%. (ERA citation 06:005917)

SERI/PR-9152-1-T1 PC **A02**/MF **A01**
Monosolar, Inc., Santa Monica, CA.
Emerging Materials for Solar Cell Applications: Electrodeposited CdTe. Second Quarter Report, May 16-August 15, 1980.
B. Basol, and O. Stafsudd. 10 Sep 80, 15p
Contract AC02-77CH00178

Work was centered about improving electroplating processes and cell fabrication techniques, with emphasis being given to three differing n-CdTe/Au Schottky configurations. The highest values of efficiency-related parmeters achieved with a simulated solar irradiation of 100 mW/cm exp 2 were 0.57V for open circuit voltage, 0.6 for fill factor, and 6 mA/cm exp 2 for short circuit current. Four important parameters are known to control the quality of the Monosolar electrodeposition process and resultant solar cells. They are electrolyte temperature, Te concentration in the solution at a specific pH, deposition or quasi-rest potential, and flow pattern of the electrolyte (stirring). The first three considerations are believed to be fully understood and optimized. Work is underway to further understand the effects of stirring on the diffusion of ionic components and the effects on CdTe film performance. Work was accelerated during the quarter to increase the short circuit current. Parallel programs using laser irradiation of finished CdTe films, heat treatment, and changes in the electrodeposition process itself to recrystallize films were started. The surface etching technique has been highly refined, while the entire cell manufacturing process is now reproducible when defect-free substrates are used. (ERA citation 06:005918)

SERI/PR-9192-1-T2 PC **A03**/MF **A01**
Poly Solar, Inc., Garland, TX.
Thin Film Polycrystalline Silicon Solar Cells. Second Technical Progress Report, July 16, 1980-October 15, 1980.
Oct 80, 32p
Contract AC02-77CH00178

The objectives of this contract are to fabricate large area thin film silicon solar cells with AM1 efficiency of 10% or greater with good reproducibility and good yield and to assess the feasibility of implementing this process for manufacturing solar cells at a cost of $300/kWe. Efforts have been directed to the purification of metallurgical silicon, the preparation and characterization of substrates and epitaxial silicon layers, and the fabrication and characterization of solar cells. The partial purification of metallurgical silicon by extraction with aqua regia has been further investigated in detail, and the resulting silicon was analyzed by the atomic absorption technique. The unidirectional solidification of aqua regia-extracted metallurgical silicon on graphite was used for the preparation of substrates, and the impurity distribution in the substrate was determined and compared with the impurity content in metallurgical silicon. The effects of heat treatment on the impurity distribution in the substrate and in the epitaxial layer have also been investigated. Large area (30 to 60 cm exp 2) solar cells have been prepared from aqua regia-extracted metallurgical silicon substrates by depositing a p-n junction structure using the thermal reduction of trichlorosilane containing appropriate dopants. The AM1 efficiencies are about 9% for cells of 30 to 35 cm exp 2 area. Larger area, 60 cm exp 2 , thin film solar cells have been fabricated for the first time, and their AM1 efficiencies are slightly higher than 8%. The spectral response, minority carrier diffusion length, and I/sub sc/-V/sub oc/ relation in a number of solr cells have been measured. (ERA citation 06:005920)

SERI/SP-633-637 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Central Receiver Systems Comparative Economics.
P. J. Eicker. Apr 80, 9p CONF-7909189-1
Contract AC02-77CH00178
Solar central receiver semiannual review meeting, Williamsburg, VA, USA, 11 Sep 1979.

Several major conceptual design studies of solar central receiver systems and components have been completed in the last year. The results of these studies are used to compare the projected cost of electric power generation using central receiver systems with that of more conventional power generation. The cost estimate for a molten salt central receiver system is given. Levelized busbar energy cost is shown as a function of annual capacity factor indicating the fraction of the cost due to each of the subsystems. The estimated levelized busbar energy cost for a central receiver (70 to 90 mills per kilowatt hour) is compared with the levelized busbar energy cost for a new coal fired Rankine cycle plant. Sensitivities to the initial cost of coal and the delta fuel escalation are shown. (ERA citation 06:005928)

STU-79-6394 PC **A03**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Energy Production from Waste Heat by Means of Elastomers or Memory Metals.
L. Ljung. May 80, 49p
In Swedish.

The thermodynamic restrictions of the production of electric power from waste heat by means of memory metals or elastomers have been studied. Calculation of the energy of an ideal heat engine for a flow between waste water and cooling water has been made. Also the Brayton, Carnot and Rankine cycles were computed as well as the processes with nitinol or elastomers as converters. It was shown that half the energy can be recovered by a nitinol heat engine which is comparable to or has better efficiency than the Rankine cycle. The memory metal makes better use of the temperature difference than the Rankine cycle. Elastomers or Gadolinium may be used to utilize energy at low waste heat temperatures. The results of the investigation shall be used for practical experiments with heat engines. (ERA citation 06:006210)

10C. Energy Storage

CONF-801022- PC **A20**/MF **A01**
Department of Energy, Washington, DC.
1980 Flywheel Technology Symposium.
1980, 470p
Contract W-7405-ENG-48
Flywheel technology symposium, Scottsdale, AZ, USA, 19 Oct 1980.

Forty-eight papers were presented at the meeting and are included in the proceedings. A separate abstract was prepared for each of 45 papers. Three papers were previously processed for EDB. (ERA citation 06:006106)

DOE/ET/29232-T1(V.1) PC **A07**/MF **A01**
Sargent and Lundy, Chicago, IL.
Characterize and Explore Potential Sites and Prepare Research and Development Plan (Site Investigation Study). Final Draft. Task 2. Milestone Report.
Dec 80, 141p
Contract AC02-78ET29232

Phase II of a 5-phase overall compressed air energy storage (CAES) development program was performed to characterize and explore potential CAES sites and to prepare a research and development plan. This volume for Phase II activities contains an evaluation of the suitability of seven selected sites to undergo field drilling and air injection testing; a bibliography; results of a literature search on the effects of air injection of aquifer-caprock well systems; reservoir data for the sites; cost estimates; and predicted potential risks from a CAES plant. (ERA citation 06:006104)

DOE/NASA/12726-6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Improvement and Scale-Up of the NASA Redox Storage System.
M. A. Reid, and L. H. Thaller. 1980, 10p NASA-TM-81632, CONF-800806-40
Contract AI04-80AL12726
15. intersociety energy conversion engineering conference, Seattle, WA, USA, 18 Aug 1980.

As larger cells and stacks are developed and tested, the NASA Redox Energy Storage System continues to show the technical performance required and cost-effectiveness for use with stand-alone photovoltaic and wind turbine installations and electric utility load-leveling. Over the past year, the anion exchange membranes and chromium electrodes have been further improved. Parametric flow studies show that pumping power requirements and shunt current losses in complete systems will be acceptable. More refined cost estimates confirm earlier predictions that system costs should be attractively low. A preprototype 1.0 kW Redox system (2 kW peak) with 11 kWh storage apacity has been built and integrated with the NASA/DOE photovoltaic test facility at NASA Lewis. This full function Redox system includes four substacks of 39 cells each (1/3 ft exp 2 active area) which are connected hydraulically in parallel and electrically in series. An open circuit voltage cell and a set of rebalance cells are used to continuously monitor the system state of charge and automatically maintain the anode and cathode reactants electrochemically in balance. Recent membrane and electrode advances are reviewed, and the results of multicell stack tests of 1 ft exp 2 hardware and the design of the 1 kW (2 kW peak) integrated system are briefly described. (ERA citation 06:006185)

DOE/TIC-11276 PC **A05**/MF **A01**
MCC Associates, Silver Spring, MD.
Project Summary Data Mechanical, Magnetic, and Underground Energy Storage Program.
Nov 80, 83p
Contract AC06-76RL01830

Summary data on 31 seasonal thermal energy storage programs; 13 compressed air energy storage programs; 4 magnetic energy storage programs; and 18 flywheel energy storage programs are presented. Principal investigator, organization, project goals, project status, contract number, contract period, funding level, and funding source information are provided for each program. (ERA citation 06:003722)

N81-15466/8 PC **A08**/MF **A01**
Delaware Univ., Newark.
Heat Storage in Alloy Transformations.
Final rept.,
C. E. Birchenall, and S. I. Gueceri. Dec 80, 163p NASA-CR-163852
Grant NSG-3184, Contract EC-77-A-31-1034

The theory of eutectic transformation was examined to find guidelines to the best material combinations to examine. The heats of transformation were measured calorimetrically, and the volume changes of expanding solid mixtures and homogeneous liquid solutions, especially during the transformation between the two states at fixed temperature, were measured by changes in X-ray absorption. Heat flow models appropriate to storage in phase change materials were developed along with efficient calculating procedures so that the relative importance of the problems associated with energy storage density, heat conduction, and similar properties could be assessed.

N81-15507/9 PC **A11**/MF **A01**
Mons Univ. (Belgium). Centre des Recherches ves l'Energie Solaire.
Solar Energy and Low Level Cyclic Energy Flow (20 to 100 Deg C) Storage as Chemical Bond Energy of Compounds Undergoing Thermal Decomposition.
Final rept.,
J. Bougard, P. Capron, and R. Jadot. 1980, 238p EUR-6739-EN
Sponsored by the Commission of the European Community.

The results of research on chemical energy storage at low temperature level are given. The use of the enthalpy variation of certain chemical reactions would make it possible to reduce the volume of the storage tank and to solve the problem of insulation by a storage at ambient temperature.

PATENT-4 187 738
Not available NTIS
Department of Energy, Washington, DC.

Rim for Rotary Inertial Energy Storage Device and Method.
Patent,
C. E. Knight, Jr., and R. E. Pollard. Filed 10 May 78, patented 12 Feb 80, 6p PAT-APPL-904 676
Supersedes PAT-APPL-904 676-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The present invention is directed to to an improved rim or a high-performance rotary inertial energy storage device (flywheel). The improved rim is fabricated from resin impregnated filamentary material which is circumferentially wound in a side-by-side relationship to form a plurality of discretely and sequentially formed concentric layers of filamentary material that are bound together in a resin matrix. The improved rim is provided by prestressing the filamentary material in each successive layer to a prescribed tension loading in accordance with a predetermined schedule during the winding thereof and then curing the resin in each layer prior to forming the next layer for providing a prestress distribution within the rim to effect a self-equilibrating compressive prestress within the windings which counterbalances the transverse or radial tensile stresses generated during rotation of the rim for inhibiting deleterious delamination problems. (ERA citation 06:006136)

SERI/TP-631-838 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Direct Contact Heat Transfer for Thermal Energy Storage.
J. D. Wright. Nov 80, 6p CONF-801055-7
Contract AC02-77CH00178
Annual thermal storage meeting, McLean, VA, USA, 10 Oct 1980.

Direct contact heat exchange offers the potential for increased efficiency and lower heat transfer costs in a variety of thermal energy storage sytems. SERI models of direct contact heat transfer based on literature information have identified dispersed phase drop size, the mechanism of heat transfer within the drop, and dispersed phase holdup as the parameters controlling direct contact system performance. However, current information is insufficient to predict these factors a priori. Therefore, tests have been defined and equipment constructed to provide independent determination of drop size, heat transfer mechanism, and hold up. In experiments with heptane dispersed in water, the equation of Kagen et. al. was found to most closely predict the drop size. The velocity at which drop formation changes from dropwise to jetting was overpredicted by all literature correlations. Further experiments are needed to conclusively determine whether the salt in a salt hydrate melt acts to block internal circulation. In addition, the potential of low temperature oil/salt hydrate latent heat storage systems is being evaluated in the laboratory. (ERA citation 06:006139)

11. MATERIALS

11A. Adhesives and Seals

AD-A093 939/7 PC **A04**/MF **A01**
Bristol Univ. (England). H. H. Wills Physics Lab.
States of Stress and Strain in Adhesive Joints Including Photoelastic Imaging of Defects in Adherends.
Final rept. 30 Sep 77-30 Sep 80,
K. H. G. Ashbee, N. R. Farrar, N. K. Kitson, S. A. Low, and A. Mears. 30 Nov 80, 71p AFOSR-TR-80-1358
Grants AFOSR-77-3448, DA-ERO-76-G-068

Water migration across the thin epoxy layer in model adhesive joints causes strongly inhomogeneous swelling. The swelling is the principal cause of stress systems which are being examined by analysis of the patterns of Newton's rings formed between a glass cover slip and an optical flat. Enhancement of water migration by normal stresses of the order of a kilobar is reported. The development of a self-stressed fracture mechanics test piece, designed to investigate water uptake by adhesives, is reported. Photoelastic imaging of ultrasonic waves can be utilized to investigate defects in opaque solids. Instead of using a piezoelectric detector, the reflected sound from a defect is actually observed in a visualizing block of quartz, after propagating from the specimen to the block across an acoustic coupling. Experiments and a computer model are described. (Author)

PAT-APPL-6-070 547 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Wet Powder Seal for Gas Containment.
Patent Application,
L. G. Stang. Filed 29 Aug 79, 18p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A gas seal is formed by a compact layer of an insoluble powder and liquid filling the fine interstices of that layer. The smaller the particle size of the selected powder, such as sand or talc, the finer will be the interstices or capillary spaces in the layer and the greater will be the resulting sealing capacity, i.e., the gas pressure differential which the wet powder layer can withstand. Such wet powder seal is useful in constructing underground gas reservoirs or storage cavities for nuclear wastes as well as stopping leaks in gas mains buried under ground or situated under water. The sealing capacity of the wet powder seal can be augmented by the hydrostatic head of a liquid body established over the seal. (ERA citation 06:006417)

PATENT-4 188 038
Not available NTIS
Department of Energy, Washington, DC.
Seal Arrangement for Intersecting Conduits.
Patent,
F. E. Goedicke. Filed 10 Apr 68, patented 12 Feb 80, 4p PAT-APPL-721 138
Supersedes PAT-APPL-721 138-68.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A seal arrangement in which two intersecting conduits are sealed from each other is described. A sleeve insert is locked in a sealed relationship within one conduit enclosing the openings of the intersecting conduit. (ERA citation 06:006084)

PB81-148637 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Liant de Lessive Sulfitee a Base D'Ammonium Utilise Dans la Fabrication des Panneaux Gaufres (Ammonium Based Spent Sulfite Liquor as Binder for Panel Products),
K. C. Shen, D. P. Fung, and L. Calve. 1980, 14p
Text in French. Abstract in English. Also pub. as ISSN-0709-4523.

The document explains that: ammonium based spent sulfite liquor from softwoods or hardwoods can be used without chemical modification as a thermosetting binder for making waferboard. A binder content of 4 percent is sufficient to produce poplar waferboard which will meet the requirements set by the Canadian Standards Association (CAN 3-0188.2-M78). The binder can be applied to the wafers in either liquid or powder form. Since its curing rate is slower than that of the conventional phenolic resin, a higher temperature or a post-heat treatment is required to cure this binder completely during board making. Nonetheless, the economic advantage of this binder system is enormous because it is a waste product from pulping and can be obtained at a very competitive price.

PB81-150757 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Appret de Produits de Bois au Moyen de Systemes a Base D'Eau (Wood Products Treatment by Means of a Water System),
R. L. Desai, A. J. Dolenko, and M. R. Clarke.
1979, 11p 512FR
Also pub. as ISSN-0709-4523. Text in French. Abstract in English.

A water based composition of a zinc salt with a suitable polymer latex has shown promise as an exterior sealer-primer for wood products. This system imparts a high level of water repellency without adversely affecting top coat adhesion and provides protection to painted surfaces against staining by wood extractives or fungi.

PB81-802407 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Adhesives: Properties, Preparation, and Applications. 1976-1978 (Citations from the NTIS Data Base).
Rept. for 1976-78.
Jan 81, 225p

This bibliography contains citations on polymer chemistry, curing, crosslinking, and synthesis for use as adhesives. The heat resistance, fracture, aging, shear strength, and other physical and mechanical properties of adhesives and sealants are covered, as is the use of adhesives in aircraft, laminates, wood bonding, electronics, and spacecraft. (This updated bibliography contains 218 citations, none of which are new entries to the previous edition.)

PB81-802415 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Adhesives: Properties, Preparation, and Applications. 1979-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Dec 80.
Dec 80, 140p
Supersedes PB80-801855, and NTIS/PS-78/1180. See also 1970-1975, NTIS/PS-77/1059.

Studies on polymer chemistry, curing, crosslinking, and synthesis for use as adhesives are cited. The heat resistance, fracture, aging, shear strength, and other physical and mechanical properties of adhesives and sealants are covered, as is the use of adhesives in aircraft, laminates, wood bonding, electronics, and spacecraft. (This updated bibliography contains 133 citations, 55 of which are new entries to the previous edition.)

PB81-803173 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Seals and Gaskets. November, 1976-December, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 76-Dec 80.
Feb 81, 290p
Supersedes PB80-802010, and NTIS/PS-78/1251. See also 1970-October, 1976, NTIS/PS-77/1092.

The citations cover both gas and liquid seals. Studies include polymers, physical properties, glass metal seals, configurations, test methods, and design. Applications involve such areas as gas turbines, water pumps, shaft seals, spacecraft seals, and other specialized seals and gaskets. Highway joint seals have been excluded. (This updated bibliography contains 285 citations, 72 of which are new entries to the previous edition.)

11B. Ceramics, Refractories, and Glasses

AD-A093 683/1 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Transparent, Polycrystalline Cubic Aluminum Oxide.
Final rept.,
James W. McCauley, and Normand D. Corbin.
Sep 80, 18p Rept no. AMMRC-MS-80-7

Supersedes report dated Jun 80, AD-A090 418. Presented at Army Science Conference, 18-19 Jun 80, West Point, NY.

The stringent mechanical/thermal and broadband electromagnetic wave transmission requirements for sensing mechanisms of the future require optimized and new material concepts. Aluminum oxide-based ceramics and single crystals are strong contenders for these applications, but exhibit significant directional variation (anisotropy) in properties. This barrier to utilization has been eliminated by an AMMRC-invented material - sintered polycrystalline nitrogen-stabilized cubic aluminum oxide (ALON). This material has been fabricated into dense, transparent bodies with isotropic properties: Knoop (100) hardness of 1800, elastic modulus of 46,000,000 psi, a dielectric constant and loss tangent, respectively, at 10 MHz of 8.56 and 0.0004, trivial oxidation in air up to 1200 C, an IR cutoff at 5.2 micrometer, and an average thermal expansion coefficient (alpha) of 0.000,007 per C (25 C-1000 C). These properties suggest greatly improved performance in many other Al2O3 applications. Successful fabrication of ALON was preceded by the determination of the high temperature phase equilibria and crystal chemistry of aluminum oxynitride spinels in the Al2O3-AlN system. (Author)

JAERI-M-8068 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Effects of Neutron Irradiation on Physical and Mechanical Properties of SM1-24 and IG-11 Graphites. Report on JAERI/KFA Juelich Graphite Irradiation Experiment HFR GG14.
Feb 79, 100p
U.S. Sales Only.

Results of the neutron irradiation tests of near-isotropic graphites (SM1-24 and IG-11) for HTGR with HFR in Petten through KFA Juelich are described, together with those of the preirradiation tests which were performed in JAERI and KFA. Irradiations were made to a maximum of about 2.5 x 10 exp 21 n/cm exp 2 (EDN) at temperatures from 1050 exp 0 C to 1150 exp 0 C. Measured were dimensional change, Young's modulus, thermal expansion coefficient up to 1000 exp 0 C, apparent density, electrical resistivity at room temperature, open porosity, thermal conductivity, and electrical resistivity between 100 to about 1000 exp 0 C, and ring compressive strength (for IG-11). 1) Dimensional change of IG-11 by high temperature irradiation was similar to that of 7477PT graphite irradiated in JMTR under same condition as HFR. Dimensional change of SM1-24 was the same as those obtained in JAERI and other institutes. 2) Increase in the Young's modulus was about 30% - 40% for both graphites. 3) Thermal expansivity of IG-11 graphite was not much changed by irradiation. 4) The increase in apparent density was about 2% in IG-11 and about 3% in SM1-24. 5) The decrease in thermal conductivity by irradiation at 1100 exp 0 C was not as large as expected, especially in SM1-24. 6) The increases in strength were about 15% for the large and about 30% for the small ring specimens. (Atomindex citation 11:524933)

N81-15105/2 PC **A03**/MF **A01**
Washington Univ., Seattle. Coll. of Engineering.
Interdisciplinary Research on the Nature and Properties of Ceramic Materials.
Semiannual Status rept., 16 Jun. - 15 Dec. 1979.
15 Jan 80, 49p NASA-CR-163854, CMR-SASR-33
Contract NGL-48-004-002

Several investigations concerning the properties and processing of brittle ceramic materials as related to design considerations are briefly described. Surface characterization techniques, fractography, high purity materials, creep properties, impact and thermal shock resistance, and reaction bonding are discussed.

PB81-148272 PC **A03**/MF **A01**
Bureau of Mines, Twin Cities, MN. Twin Cities Metallurgy Research Center.
High-Temperature Corrosion Resistance of Alumina Refractories to Lignite Ash Slags.
Rept. of investigations/1980,
J. E. Pahlman, C. F. Anderson, and S. E. Khalafalla. 1980, 27p BUMINES-RI-8430

As part of its goal to minimize the requirements for mineral commodities through conservation and substitution, the Bureau of Mines is conducting research to determine the resistance of alumina refractories to corrosion by alkali-containing slags that could result from burning of the abundant Western lignites in metallurgical operations. Static corrosion tests were performed at 1,000 to 1,350 C and dynamic tests were performed at 1,400 to 1,600 C to investigate the stability of refractory specimens in slag environments.

PB81-148421 PC **A11**/MF **A01**
Texas Tech Univ., Lubbock. Inst. for Disaster Research.
A Failure Prediction Model for Window Glass,
William Lynn Beason. May 80, 229p NSF/RA-800231
Grant NSF-PFR77-24063

An analytical method is presented to predict the strength of window glass plates subjected to lateral loads. The failure prediction model will be used to assess glass plate strength to be used in designing window glass. The model relates the probability of glass plate failure to fundamental glass plate surface properties. It incorporates the following: (1) an analytical representation of the variation of glass strength with different environmental factors; (2) a geometrically nonlinear plate analysis; and (3) a statistical representation of glass plate surface flow properties. The model is formulated so that surface flow proerties are dependent only upon the type and treatment of the glass, and are independent of factors such as plate aspect ration, plate glass surface area, and load duration. Validity of the nonlinear plate analysis, incorporated in the model, was demonstrated by comparison of actual and theoretically derived glass plate stresses and deflections. It also was shown that surface flow parameters employed in the production model are independent of plate response. Hence, the failure prediction model was verified.

PB81-150120 PC **A02**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Research Center.
Effect of Additives on Sintering of Silicon Nitride-Alumina Compositions.
Rept. of investigations/1980,
B. W. Jong. 1980, 22p BUMINES-RI-8466

As a part of the Bureau of Mines program to develop substitute or improved performance refractory materials for metallurgical applications, the Tuscaloosa Research Center has evaluated the effect of additives on sintering and strength properties of sialon (silicon aluminum oxynitride) compositions fabricated by a conventional powder metallurgy technique. Additions of Y2O3, Gd2O3, CeO2, MgO, ZrO2, ZrSiO4, and MgAl2O4 to a sialon composition containing 70 pct beta-Si3N4 + 30 pct alpha-Al2O3 increased sintered densities by as much as 50 pct over densities of undoped material.

PB81-150179 PC **A02**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Research Center.
A Laboratory Test to Evaluate the Resistance of Refractories to Molten Slags.
Rept. of investigations/1980,
J. R. Cobble, and L. Y. Sadler, III. 1980, 19p BUMINES-RI-8468

As part of the Federal Bureau of Mines project to develop new or improved materials for metallurgical furnace applications, research was conducted to develop a reproducible laboratory test for evaluating the resistance of refractories to molten slags. Tests were conducted with a slag representative of slag used to produce mineral wool. A rotating cylindrical furnace was lined with the brick being tested, and it was operated at temperatures up to 1,660 C for periods ranging from 8 to 32 hours. The effects of such variables as slag temperature, rotational velocity, charge rate, and contact time on refractory erosion were determined. The research demonstrated the reproducibility of the test procedure developed.

PB81-802431 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite: Carbon Research. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 208p
Supersedes PB80-802416, and NTIS/PS-78/1054.

The cited studies cover the use, physical and mechanical properties, production, and chemistry of various forms of carbon, such as carbon black, carbon foams, chars, coke, and activated carbon. Graphite and glassy carbon research are covered in separate bibliographies, as are studies on carbon and graphite fibers and their composites. (This updated bibliography contains 201 citations, 22 of which are new entries to the previous edition.)

PB81-802464 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite: Glassy Carbon. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 80p
Supersedes PB80-802424, and NTIS/PS-78/1055.

The research reports describe glassy carbon preparation, structure, properties, composites, and alloys with metals. (This updated bibliography contains 73 citations, 5 of which are new entries to the previous edition.)

11C. Coating, Colorants, and Finishes

AD-A093 494/3 PC **A03**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Proposed Military Specification. Primer Coating, Zinc Dust Pigmented for Exterior Steel Surfaces,
R. F. Supcoe. 23 Apr 80, 26p Rept no. DTNSRDC/TM-28-80-51
See also Supplement, AD-A093 495.

Proposed military specification on zinc protective coatings, five year performance, quality control procedures reference. Background user agency (150) zinc rich paint coatings listed. (Author)

AD-A093 495/0 MF **A01**
Artech Corp., Falls Church, VA.
Review of Specifications for Zinc-Rich Paints,
Fred Ordway, and Mark J. Hammell. Sep 79, 855p ARTECH-J7600.159-FR, DTNSRDC-TM-28-80-51-SUPPL
Contract N00600-76-D-0511
Supplement to Rept. no. DTNSRDC-TM-28-80-51 dated 23 Apr 80, AD-A093 494.
Availability: Microfiche copies only.

Specifications on zinc-rich paints that are now in use or proposed have been collected from governmental agencies, industry associations, and manufacturers. A tabulated comparison of 48 specifications, which were received in time for compilation, is presented. Complete copies of all those received, 78 in number, are appended. The choice of requirements for a new specification depends upon the selection of the formula, performance, and/or qualified product approaches. Statements of requirements in current specifications are adequate to cover all aspects except the characterization of the basic electrochemical protective function peculiar to the zinc-rich paints. Development of suitable electrical/electrochemical test specifications is recommended. (Author)

AD-A093 799/5 PC **A03**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Resistance of Coated and Uncoated IR Windows to Seawater Corrosion. Phase IV.
Final rept. Oct 79-Jun 80,
J. D. Stachiw, and S. L. Bertic. 1 Oct 80, 44p
Rept no. NOSC/TR-587
See also Rept. nos. NOSC/TR-572, AD-A092 649 and NOSC/TR-421, AD-A076 297.

Germanium and chalcogenide glass specimens were submerged to a 35-foot depth in San Diego Bay for 130 days and the deterioration of their surfaces noted. The germanium specimens were coated either with multilayer antireflective infrared (IR) coatings, or with chalcogenide glass protective coating, while the chalcogenide glass specimens were tested bare. The submerged specimens were subjected to a forced water circulation at approximately 6-feet-per-second velocity to simulate actual operational scenarios to which a submarine-mounted IR window may be subjected. The chalcogenide AMTIR-1 glass specimens and the germanium specimens protected by the chalcogenide glass coating XF206 exhibited excellent corrosion resistance. The multilayer durable antireflection (AR) 40100 although not as corrosion resistant as chalcogenide glass coating, exhibited the best corrosion resistance of all AR coatings tested in this study. Other AR coatings on germanium deteriorated to different degrees. The severest deterioration took place on a germanium specimen covered with multilayer coating (XF204), but even there the transmission decreased only be approximately 5 percent, in the presence of many shallow (< or = 0.010-inch) and few deep (< or = 0.030-inch) corrosion craters in the surfaces of the germanium specimens. Carbon coatings, because of their potential resistance to seawater and abrasion, have been selected as the next class of coatings for evaluation in seawater environment.

AD-A094 017/1 PC **A03**/MF **A01**
Harco Corp., Medina, OH.
Pipe-to-Soil Potential Limits for Protective Coatings.
Final rept. Nov 77-Apr 80,
Bernard Husock. Nov 80, 38p AFESC/ESL-TR-80-26
Contract F08635-77-C-0248

This report summarizes the results of a study undertaken to determine the limiting potential criteria for cathodic protection of coated metallic underground and underwater facilities to avoid damage from hydrogen evolution. Tests of 30 days duration were performed in Houston tap water on four coatings, i.e., fusion bonded epoxy, coal tar, plastic tape and asphalt. Each coating was cathodically protected at polarized instant off potential levels of -1.02, -1.07, -1.12, -1.17, and -1.22 volts to copper-copper sulfate. It was found that hydrogen evolution is initiated at a polarized potential of -1.12, volts and becomes more vigorous as the applied current is increased. The polarized potential value increases as the current increases only up to a value of -1.22 volts. An increase in applied current beyond that value increases the hydrogen evolution and increases the ON potential, but there is no measurable increase in the OFF potential. The different coatings tested reacted differently in these tests. These short term tests should not be used for comparison of disbondment resistance. One coating experienced disbondment at an OFF potential where no gas was evident, and another coating experienced no disbondment even at -1.22 volts under vigorous hydrogen evolution. (Author)

BDX-613-2517 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Parylene Coating of Syntactic Composites.
A. H. Schloman. Nov 80, 36p
Contract AC04-76DP00613

A manufacturing process developed for parylene coating syntactic parts has resulted in several improvements. Thin edges have been strengthened, which minimizes breakage during the manufacturing process and subsequent assembly; part and surface toughness has been improved; the coefficient of friction during assembly has been reduced; and the bonding of the pads, shoehorn, and clips has been enhanced. Improvements in the tensile strength and flexural strength of the syntactic composite as a result of the coating are discussed, and coated parts and deposited films produced by laboratory and production coaters are compared. (ERA citation 06:006279)

N81-15072/4 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
The Resistance of Tank Protective Measures to Microorganisms Resistance des Protections de Fonds de Reservoirs aux Microorganismes.
G. Dallemagne. 16 Sep 80, 18p SNIAS-801-551-107
Text in French. Presented at 4EME Journees du Vieillissement des Polymeres, Station de Bandol, 19 Sep. 1980.

Various painys, pigments, and varnishes were studied to determine their effectiveness in protecting JPI/H2O against biocontamination by Cladiosporium resinae. In order of decreasing resistance, they were found to be: (1) PU: a varnish polymerized at 60 C and promers inhibited by ZnCrO4 and SrCrO4; (2) a cured epoxy/amine primer, inhibited by BaCrO4; and (3) epoxide/amide and epoxide/amine-amide primers inhibited by SrCrO4. Of the systems examined, it is advisable not to use NBR varnish, with and without inhibitors, and epoxide/amine-amide primers inhibited by BaCrO4 in biodeteriorating milieu.

PB81-151292 PC **A05**/MF **A01**
Browning Engineering Corp., Hanover, NH.
Extreme Impact Velocity Metal and Ceramic Deposition, Phase I.
Final rept.,
James A. Browning, and Richard W. Whitfield. 26 Mar 80, 100p NSF/RA-800307
Grant NSF-DAR79-16720
Portions of this document are not fully legible.

Successful use of internal burner flame jets to accelerate molten metal particles to extreme velocity for high quality coatings is reported. Flame jets were designed and tested in two basic operational modes for producing coatings: (1) an open system used as a particle stream focuser and/or a particle accelerator; and (2) a closed system used both as a particle/wire melter and a particle separator. Powders and wires of a great variety of metals and ceramics were melted by either an oxy-fuel flame, plasma-arc torch, or electric arc and introduced into high velocity flame jets. Resulting coatings have been metallographically examined, revealing that the quality of standard oxy-fuel spray coatings is superior to that of plasma-sprayed coatings. Plasma coatings are expected to be better than those deposited by the D-gun when air pressures much higher than the 120 psig are used. Photomicrographs are included in this report.

PB81-858458 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Antifouling Coatings for Marine Environments. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80,
Jan 81, 56p

This retrospective bibliography cities research reports relating to the use of antifouling and anticorrosive materials in the marine environment. Included are paints, metal cladding and plastic coatings, as well as cathodic protection. The use of marine concrete as a protective media is also reviewed. (Contains 46 citations, fully indexed and including a table of contents.)

PB81-858698 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Protective Coatings for Pipelines. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Jan 81, 126p

This retrospective bibliography cities research reports relating to the external and internal protection of pipelines. Techniques include cathodic protection, materials selection, protection of welded joints, alloy overlays, and plastic tape wrapping as well as special coatings for use with hot fluid pipelines. (Contains 116 citations, fully indexed and including a table of contents.)

11D. Composite Materials

AD-A093 658/3 PC **A16**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Electromagnetic Effects of (Carbon) Composite Materials Upon Avionics Systems.
Conference proceedings,
F. S. Stringer. Oct 80, 372p Rept no. AGARD-CP-283
Presented at the Technical Meeting, of the Avionics Panel of AGARD (39th), held in Lisbon, Portugal on 16-19 Jun 80.

Contents: Session I Materials and Applications; Session II - Characteristics, Measurements, Modelling and Standards; Session III - Specific Topics and Research Programs; Session IV - Electromagnetic Effects Upon Radiation Patterns, Electrostatic and Lightning Problems; Session V - Protection and Tradeoff Methods.

AD-A093 789/6 PC **A17**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Literature Research on the Mechanical Properties of Fibre Composise Materials Analysis of the State of the Art. Volume I. (Schrifttumsrecherche zum Festigkeitsverhalten von Faserverbundwerkstoffen-Analyse des Standes der Technik-),
J. J. Gerharz, and D. Schuetz. 11 Aug 80, 382p RAE-LIBRARY TRANS-2045, DRIC-BR-76376
Trans. of Fraunhofer-Institut fuer Betriebsfestigkeit LBF Report No. TB-145 (1979) (Germany, F.R.) v1 Jul 79, by Barbara Garland. See also Rept. no BMVG-FBWT-73-17, AD-914 463.

This is a comprehensive review of mechanical considerations in the structural use of fiber composite materials, based on 794 references to the literature, with the emphasis on the aerospace application of resin matrix materials with fibres of carbon, glass, boron and kevlar. The report first discusses data on mechanical properties: static strength of plain, notched and jointed material and the influence of impact damage, environment and creep; fatigue behavior under constant amplitude and flight by flight loading, the influence of environment and the effect of load cycling on deformation; residual strength following load cycling and impact. It then presents physical observations of damage development in different structural situations, and available methods of damage detection and measurement. Then follows discussion of the application of fracture mechanics to damage growth and residual strength; methods of stress analysis for loading and environment and prediction of failure; structural design procedures for static and fatigue strength; and inspection methods for ensuring quality in production and safety in service. A section is included on test techniques and methods for determining mechanical behavior of coupons, components and structures, and a section on the absorption of moisture and its effect on mechanical properties. Finally the report surveys the field of structural applications which exploit composite properties, discusses economic factors and construction methodology, and makes recommendations on the further development of fibres and matrices and on future research. (Author)

AD-A093 812/6 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
Ultrasonic Non-Destructive Testing of Materials.
Interim rept. no. 2, 1 Aug 78-31 Jul 80,
Wolfgang Sachse, and Yih-Hsing Pao. Dec 80, 25p AFOSR-TR-80-1366
Contract F49620-78-C-0100

This report describes broadband measurements of ultrasonic dispersion and attenuation in cross-plied specimens of graphite-epoxy. Quantitative comparisons of dispersion and attenuation data are made by means of least-square fit algorithms implemented into the ultrasonic signal processing system. Reproducible measurements in graphite-epoxy have been obtained. Two new frequency-dependent attenuation measurement techniques are described for measurements in composite materials. One is a continuous-wave resonance technique and the other is based on the Kramers-

Kronig relation to find the attenuation from measurement of the dispersion. The new techniques are expected to be especially useful for measurements in highly absorbent composite specimens. A firm basis for the technique has been established and measurements with graphite-epoxy specimens are described. Good agreement can be obtained between the various attenuation measurement techniques. (Author)

AD-B000 374/9 PC **A04**/MF **A01**
TRW Systems Group, Redondo Beach, CA.
Exploratory Development of Processable Laminating Resins With Improved Toughness and Moderate Temperature Capability - Phase II and III.
Final technical rept. 1 Jun 73-1 Jun 74,
Robert W. Vaughan, Robert J. Jones, G. A. Zakrzewski, and M. K. O'Rell. Jul 74, 56p TRW-22298-6026-TU-00, AFML-TR-73-243-Vol-2
Contract F33615-72-C-2122
See also Volume 1, AD-918 864L.
Distribution limitation now removed.

A new polyimide resin is developed that provides processing characteristics and basic mechanical properties equivalent to those of commercially available high performance epoxy resins. This new resin, DONA polyimide resin, provides high resistance to moisture thus overcoming a major problem associated with the high performance epoxy resins. An alternative polyimide resin, DAS polyimide resin, is also identified but not developed to the same level as the DONA resin. Fracture toughness studies are performed on DONA/A-S GRAPHITE FIBER COMPOSITES AND COMPARISONS ARE DRAWN WITH EPOXY/A-S graphite fiber composites. Strength retention at 365 F of these composites is equivalent to that of high performance epoxy systems. (Author-PL)

AD-847 162/5 PC **A03**/MF **A01**
General Motors Technical Center, Warren, MI. Materials and Structures Lab.
Material Response Studies (MARS I). Volume I: Summary.
Final rept.,
S. J. Green, R. D. Perkins, and S. G. Babcock. Jan 68, 33p MSL-68-8-Vol-1, SAMSO-TR-68-71-Vol-1
Contract F04694-67-C-0033
See also Volume 2, AD-842 604L.
Distribution limitation now removed.

The purpose of the Material Response Studies (MARS I) program was to develop new techniques for evaluating the response of current and anticipated reentry vehicle materials to impulsive loads, such as a blast from a nuclear device, and to continue investigations of characterizing the mechanical properties of these materials at high strain rates and elevated temperatures. The four engineering tasks were: Uniaxial Stress Behavior to 10,000/second; Development of Multiaxial High Strain-Rate Test Techniques; Mechanical Properties of Ablative Materials up to Active Ablation Temperature; and Fundamental Study of the High Strain-Rate Behavior of Composites.

MLM-2766 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Characterization of Fiberglass-Filled Diallyl Phthalate Plastic Molding Resins and Molded Parts.
R. B. Whitaker, J. E. Glaub, N. R. Bonekowski, and P. D. Gillham. 1 Dec 80, 25p
Contract AC04-76DP00053

Characterization of diallyl phthalate (DAP) molding resins was undertaken by differential scanning calorimetry (DSC) and by combined size exclusion chromatography (SEC)/low angle laser light scattering (LALLS) in order to better predict moldability and storage life limits. Completeness of cure of molded parts, before and after any post-curing, was also determined by thermal analysis. Molecular weights and molecular weight distributions of the DAP molding resins by SEC/LALLS indicated that the better molding resins have lower M/sub w//M/sub n/ ratios. Association effects were observed, which could not be overcome by solvent modification alone. Determination of DAP molding resin heats of reaction by DSC indicated a linear relation between delta H/sub R/ and weight percent filler for the good molding resins. DSC analyses of molded DAP parts showed that 95% cure was achieved in some as-molded parts, with a post-cure temperature of 165 exp 0 C being required to complete the cure to 100%. Thickness of the parts was a factor, with the thicker parts being 100% cured as molded. The glass transition temperature (T/sub g/) of the molded parts increased as cure was completed, to approx. 160 to 165 exp 0 C maximum. These results are consistent with a model of thermoset resin curing behavior which states that 100% cure can be achieved only if a post-curing operation is conducted above the T/sub g infinity/ (T/sub g/ at complete cure) of the polymer. (ERA citation 06:006280)

N81-12175/8 PC **A02**/MF **A01**
California Univ., Berkeley.
Method for Producing Thin Sheets of Proton-Sensitive Cr-39 Plastic Detectors.
Final Report, 16 Mar. 1979 - 15 Mar. 1980,
K. Kinoshita. Apr 80, 8p NASA-CR-160037, SSL-SER-21-ISSUE-9
Contract NAS5-25453

Procedures for fabricating large sheets of CR-39 with uniform chemical reactivity and sensitivity and which retain a clear, smooth surface after prolonged etching were investigated. Very thin sheets for certain Spacelab applications were fabricated.

N81-15024/5 PC **A05**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Textile Materials and Management.
Effect of High Energy Radiation on Mechanical Properties of Graphite Fiber Reinforced Composites.
M.S. Thesis.
N. Naranong. 1980, 91p NASA-CR-163853
Sponsored by NASA and United Nations.

The flexural strength and average modulus of graphite fiber reinforced composites were tested before and after exposure to 0.5 Mev electron radiation and 1.33 Mev gamma radiation by using a three point bending test (ASTM D-790). The irradiation was conducted on vacuum treated samples. Graphite fiber/epoxy (T300/5208), graphite fiber/polyimide (C6000/PMR 15) and graphite fiber/polysulfone (C6000/P1700) composites after being irradiated with 0.5 Mev electron radiation in vacuum up to 5000 Mrad, show increases in stress and modulus of approximately 12% compared with the controls. Graphite fiber/epoxy (T300/5208 and AS/3501-6), after being irradiated with 1.33 Mev gamma radiation up to 360 Mrads, show increases in stress and modulus of approximately 6% at 167 Mrad compared with the controls. Results suggest that the graphite fiber composites studied should withstand the high energy radiation in a space environment for a considerable time, e.g., over 30 years.

PB81-802449 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite: Carbon and Graphite Fibers and Fiber Composites. September, 1977-October, 1979 (Citations from the NTIS Data Base).
Rept. for Sep 77-Oct 79.
Jan 81, 248p

Citations cover reinforcement of numerous polymers and metals by carbon and graphite fibers. Studies include processing, design, properties, stress analysis, and performance of the composite structures or parts. Composites from polyimide, epoxy, and aluminum matrices are among the types cited. Fabrication and testing of materials for rocket nozzles, reentry vehicles, aircraft components, automobiles, and ships are included. (This updated bibliography contains 241 citations, none of which are new entries to the previous edition.)

PB81-802456 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite: Carbon and Graphite Fibers and Fiber Composites. November, 1979-December, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 79-Dec 80.
Jan 81, 151p
Supersedes PB80-802366, and NTIS/PS-78/1050. See also 1964-1973, NTIS/PS-75/612, 1974-July, 1976, NTIS/PS-77/0843, and August, 1976-August, 1977, NTIS/PS-78/1049.

Citations cover reinforcement of numerous polymers and metals by carbon and graphite fibers. Studies include processing, design, properties, stress analysis, and performance of the composite structures or parts. Composites from polyimide, epoxy, and aluminum matrices are among the types cited. Fabrication and testing of materials for rocket nozzles, reentry vehicles, aircraft components, automobiles, and ships are included. (This updated bibliography contains 144 citations, all of which are new entries to the previous edition.)

PB81-802480 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite: Carbon and Graphite Composites (Excluding Carbon Fiber Composites). 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 327p
Supersedes PB80-802374, and NTIS/PS-78/1051.

Reports on carbon or graphite composites which are not specifically concerned with carbon or graphite fibers are cited. This includes studies on non-fiber carbon reinforcement, carbon or graphite matrix composites, applications, properties, fabrication, and structural analysis. The majority of research concerns aircraft components and ablative materials for rockets. (This updated bibliography contains 320 citations, 58 of which are new entries to the previous edition.)

11E. Fibers and Textiles

AD-914 659/8 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Effect of a High Strength-to-Weight Ratio Material on Parachute Performance at Mach Number 0.8.
Final rept.,
W. L. Peters. Nov 73, 32p Rept no. AEDC-TR-73-184
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn., Rept. no. ARO-PWT-TR-73-128.
Distribution limitation now removed.

Tests were conducted in the AEDC Propulsion Wind Tunnel (16T) to determine the deployment and inflation characteristics of five conical ribbon parachute configurations with individual parachute components (suspension lines, radials, and canopy ribbons), in each configuration constructed with nylon material or a new textile material, Fiber B. Dynamic deployment data were obtained at a nominal Mach number of 0.8 and dynamic pressures of 350 to 530 psf, and steady-state data were obtained at Mach numbers from 0.6 to 1.3 and a dynamic pressure of 200 psf. In general, parachutes constructed of Fiber B material withstood the same opening shock loads while exhibiting a shorter damping time for deployment drag loads compared with the nylon-constructed parachutes. A significant drag-to-weight increase and a steady-state drag increase with increasing dynamic pressure resulted from the use of Fiber B material compared to nylon material in parachute construction. The least post-deployment drag dynamics were exhibited by those parachutes which had Fiber B-constructed canopy ribbons and radials. (Author)

11F. Metallurgy and Metallography

AD-A093 453/9 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Investigating the Effects of Low Temperature Annealing of Amorphous Corrosion Resistant Alloys.
Rept. no. 3 (Final) 1 May 77-31 Oct 80,

R. B. Diegle, and D. M. Lineman. Nov 80, 69p
Contract N00014-77-C-0488

This research program was conducted in two phases. Annealing-induced changes in corrosion and mechanical properties of amorphous alloys were investigated during 1979-80, whereas earlier studies during 1977-1979 involved characterizing the localized corrosion resistance and feasibility of sputtering such alloys. Annealing, performed at temperatures up to that causing crystallization, produced embrittlement of $Fe_{32}Ni_{36}Cr_{14}P_{12}B_6$ at 100-200 C, as measured by bending. Embrittlement preceded crystallization, which initiated during a substantially higher temperature of 400 C. Annealing of $Fe_{32}Ni_{36}Cr_{14}Si_6B_{12}$ resulted in embrittlement at 300-400 C, which coincided with crystallization in this alloy. Segregation of phosphorus is believed to have caused embrittlement of the former alloy, whereas embrittlement of the latter was probably induced by crystallization. Susceptibility of both alloys to corrosion in chloride solutions increased dramatically with the occurrence of crystallization. This increase appeared as a reduction in the critical pitting potential with increasing degree of crystallization. Research performed during 1977-1979 showed that Fe-Ni-Cr-P-B alloys resist crevice corrosion as well as pitting. This observation was interpreted as indicating that even if initiation of localized corrosion is facilitated by introducing a crevice geometry, corrosion cannot proceed because of the considerable resistance of these alloys to propagation of attack. It was also demonstrated that these alloys can be sputtered as amorphous layers that exhibit essentially the same resistance to pitting corrosion as alloys of similar composition, but prepared by liquid quenching. (Author)

AD-A093 454/7 PC **A03**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY.
Liquid Metal Embrittlement of Amorphous Alloys.
Technical rept. 1 Jul 79-15 Sep 80.
Norman S. Stoloss, Sankaranarayanan Ashok, Martin E. Glicksman, and Thomas Slavin. 15 Sep 80, 27p
Contract N00014-79-C-0583

Liquid metal embrittlement of four iron-base amorphous alloys has been demonstrated by means of tensile and bend tests. Fractographic features are shown to change markedly when fracture is accomplished under liquid metals. Similarities are noted between fractographic features in liquid metals and after hydrogen charging. The results are shown to be generally consistent with a model of adsorption-enhanced shear at crack tips by embrittling agents. (Author)

AD-A093 509/8 PC **A11**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
The Effect of Defects on the Fatigue Initiation Process in Two P/M Superalloys.
Final rept. Nov 77-Nov 79,
Jack M. Hyzak. Sep 80, 229p Rept no. AFWAL-TR-80-4063

A metallurgical investigation was performed to determine the effect of defect size, shape, and population on the fatigue initiation process in two high strength P/M superalloys, AF-115 and AF2-1DA. The specific alloy heats tested had contrasting defect populations; the AF-115 alloy contained a large population of spherical pores, and a lesser number of elliptical ceramic inclusions and platelike hafnium oxide inclusions, and the AF2-1DA material contained only a small population of the elliptically shaped inclusions. Strain controlled fatigue tests were performed on uniform section specimens at 760 C, 649 C, and 22 C using both continuously cycling and cyclic dwell waveforms. Microscopic examination of the failed specimens showed that for the high temperature tests there was a transition in the nucleation site of the cracks that caused failure from a surface to a subsurface location as the strain range was reduced. This surface-subsurface transition (SST) occurred at approximately the same strain range for both alloys.

AD-A093 697/1 PC **A02**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Prediction of Creep of Al 2618 under Variable Multiaxial Stresses.
Final technical rept. 20 Sep 79-19 Sep 80,
William N. Findley. 3 Dec 80, 7p ARO-15508.4-E
Grant DAAG29-79-G-0185

Simultaneous creep in torsion and stress relaxation in tension experiments with proportional and non-proportional load changes were reasonably predicted by a modified viscous-viscoelastic model. Creep experiments at stresses below a transition stress showed linear behavior with no synergistic effect. Above the transition, creep was non-linear and synergistic. Stress reversal at low stresses showed the same time dependence for both positive and negative stressing, but prior creep was not wiped out. At higher stresses prior creep was wiped out on complete reversal of stress. (Author)

AD-A093 725/0 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Materials Science.
Changes in Residual Stresses during Tension Fatigue of Normalized and Peened SAE 1040 Steel.
Technical rept.,
M. McClinton, and J. B. Cohen. 1 Jan 81, 25p
Rept no. TR-3
Contract N00014-80-C-0116, Grant NSF-DMR76-80847

Appreciable compressive stresses develop during tensile fatigue (R=O) of normalized SAE 1040 steel, but only in or near regions of stress localization. These stresses develop in stages. After shot peening, the resultant compressive stresses are rapidly eliminated by tension-tension fatigue above the endurance limit, and replaced by tensile stresses. At lower stress levels the induced stresses fade quickly. (Author)

AD-A093 733/4 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Interaction Among Inhomogeneities.
Final rept. 15 Nov 76-30 Sep 80,
T. Mura. Dec 80, 10p ARO-14127.17-E
Grant DAAG29-77-G-0042

In this project, the basic research on inclusions and its application to inhomogeneities of materials has been sought. Interactions among precipitating particles, cracks, voids, and plastic domains have been investigated to obtain overall mechanical properties of materials. (Author)

AD-A093 773/0 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
Quasi-Static Stress-Strain Curves, S-7 Tool Steel.
Final rept.,
Ralph F. Benck, Robert E. Franz, and Dominick A. DiBerardo. Oct 80, 31p ARBRL-MR-03067, AD-E430 556

The results of quasi-static, uniaxial, compression, and tensile and sonic elastic moduli room temperature tests of S-7 tool steel are presented. The modulus of elasticity, shear modulus, Poisson's ratio, yield strength, and bulk modulus of various tempers of S-7 tool steel are reported as well as the stress-strain curves for both compression and tensile loading.

AD-A093 801/9 PC **A03**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Factors Affecting the Corrosion of Tin in the Presence of Reducible Inorganic and Organic Substances.
Final rept. 1 Jul 77-30 Jun 80,
Henry Leidheiser, Jr., Richard D. Granata, Alton Rauch, and Elhoseny M. Ibrahim. 15 Dec 80, 39p ARO-14918.1-MS
Contract DAAG-29-79-C-0106, Grant DAAG29-77-G-0178

The purpose of these studies is to obtain a better understanding of the role which antimony plays in accelerating the corrosion of tin. Tin-antimony alloys were prepared by electrodeposition and the corrosion rates were determined from polarization data obtained in deaerated 0.33M citric acid. The corrosion rates were linearly related to the antimony concentration in the alloy and could be described by the following equation: Corrosion rate in A/sq. m. = 0.0003 + 0.000079X where X is the antimony concentration in the tin in ppm. Nitrite additions to the deaerated citric acid greatly accelerated the corrosion rate. The effect of nitrite could be described by the following equation: Corrosion rate in A/sq. m. = 0.0003 + 0.021Y where Y is the nitrite concentration in the citric acid in ppm. The nitrite results and the great effect of antimony on the corrosion rate were attributed to the fact that a partially oxidized surface serves as a remarkably effective catalyst for the cathodic hydrogen evolution of tin. (Author)

AD-A093 802/7 PC **A02**/MF **A01**
Connecticut Univ., Storrs. Dept. of Metallurgy.
Research Program on the Fatigue of Titanium Alloys.
Final rept. 1 Oct 79-30 Sep 80,
A. J. McEvily. 30 Sep 80, 15p AFOSR-TR-80-1347
Contract F49620-79-C-0004

A two year period of research on the fatigue characteristics of titanium alloys has been completed. Many of the aims of the program have been achieved. However, due to the late receipt of a large number of the test specimens, not all of the testing and study of the low cycle fatigue behavior investigations could be completed on schedule. Despite the extra costs involved, we expect to complete the test portion of the program by the end of 1980. Research on fatigue crack growth and the effects of overloads as well as a study of creep crack growth in a titanium alloy has been completed. (Author)

AD-A093 803/5 PC **A08**/MF **A01**
McDonnell Aircraft Co., St. Louis, MO.
Environment-Load Interaction Effects on Crack Growth in Landing Gear Steels.
Final rept. Aug 79-Aug 80
C. R. Saff. Oct 80, 155p NADC-79095-60
Contract N62269-79-C-0275

The objective of this program was to investigate chemical environment-load interaction effects on crack propagation. Dry air (<10 percent relative humidity) was used as a reference environment. Alternate immersion in synthetic sea water was used to simulate the aggressive chemical environment to which Navy carrier based aircraft are subjected. Tests were performed to determine the behavior of 300M and HP-9-4-.30 steel in both environments under a variety of stress ratios and load wave shapes. A crack growth prediction capability developed through analysis and test accounts for environment and load interaction effects. A flight-by-flight test stress history was developed for a landing gear of a carrier based Navy aircraft. Crack growth predictions were prepared and tests performed to verify the chemical environment-spectrum loading analysis capability. A comparison of landing gear spectra under Air Force and Navy design conditions is presented. (Author)

AD-A093 860/5 Not available NTIS
Illinois Univ. at Urbana-Champaign.
Analytical Studies on Some Microconstituents in 2024 Aluminum Alloy,
A. Munitz, A. Zangvil, and M. Metzger. 8 Apr 80, 7p ARO-13847.4-MSX, ARO-14350.6-MS
Grants DAAG29-78-G-0067, DAAG29-79-G-0019
Availability: Pub. in Metallurgical Transactions A, v11A p1863-1868 Nov 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 945/4 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
Flux Shielded Welding of Titanium.
Annual rept. no. 3, 1 Aug 79-31 Jul 80,
C. Huntington, T. D. Burleigh, L. Wilson, R. Thompson, and A. Block-Bolten. 30 Sep 80, 34p
Rept no. TR-4
Contract N00014-77-C-0569

This is the third annual report of studies concerned primarily with submerged arc welding of titanium. During the current period studies have been directed toward recycling fluxes as a means of reducing costs, modification of flux chemistries to improve operating properties, the physics of enhanced weld penetration in the presence of fluxes and a

brief evaluation of newly available Soviet literature on the subject. The recycling efforts have been unsuccessful; however, a new purification process which may simplify the procedure has been proposed but has not been tested. Modifications to the flux chemistry confirm that the cation activity of the flux is the primary factor contributing to oxygen refining capacity. The tests of enhanced weld penetration are as yet inconclusive. (Author)

AD-A093 951/2 PC **A03**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Mechanism of Sulfide-Accelerated Corrosion of Copper-Nickel (90-10) Alloy in Seawater.
Final rept.,
Malcolm E. Schrader. Dec 80, 27p Rept no. DTNSRDC-80/127

The mechanism of sulfide-induced accelerated corrosion of 90-10 copper-nickel (iron) alloy is investigated. Samples of the alloy are exposed to flowing (2.4 meters per second) seawater, with and without 0.01 milligrams per liter sulfide, for various periods of time. The resulting surfaces are examined by means of Auger electron spectroscopy coupled with inert-ion-bombardment. A detailed depth profile is thereby obtained of concentrations in the surface region of a total of nine elements. The results are consistent with the hypothesis that iron hydroxide segregates at the surface to form a protective gelatinous layer against the normal chloride-induced corrosion process. Trace sulfide interferes with formation of a good protective layer and leaves the iron hydroxide vulnerable to ultimate partial or complete debonding. When the alloy is first exposed to pure seawater for a prolonged period of time, however, subsequent exposure to sulfide is no longer deleterious. This is apparently due to a layer of copper-nickel salt that slowly forms over the iron hydroxide.

AD-A093 964/5 PC **A02**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Metallurgy and Materials Science.
The Omega-Phase Reaction in Titanium Alloys.
Technical rept.,
T. W. Duerig, G. T. Terlinde, and J. C. Williams. Feb 80, 12p Rept no. JWTR-6
Contract N00014-76-C-0409

A morphological transition from ellipsoidal Omega particles to cuboidal particles is reported to occur while isothermally aging in Ti-10V-2Fe-3Al. In light of this discovery, as well as others, the Beta to Omega reaction of Beta stabilized Ti alloys is discussed. An isothermal growth mechanism which couples minor compositional fluctuations and lattice displacement waves is proposed. (Author)

AD-A093 965/2 PC **A02**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Metallurgy and Materials Science.
Stress Assisted Transformation in Ti-10V-2Fe-3Al.
Technical rept.,
T. W. Duerig, R. M. Middleton, G. T. Terlinde, and J. C. Williams. Feb 80, 12p Rept no. JWTR-7
Contract N00014-76-C-0409

A stress assisted, or stress-induced reaction, is reported in the beta-Ti alloy - Ti-10V-2Fe-3Al. Both X-ray diffraction and electron microscopy are used to identify the products. The results indicate the product to be predominantly orthorhombic martensite (alpha double prime), with some mechanical twins. The structural nature of the beta yields alpha double prime transformation is discussed. The effects of the beta yields alpha double prime reaction upon mechanical properties is also discussed. (Author)

AD-A093 966/0 PC **A02**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Metallurgy and Materials Science.
The Effect of Heat Treatment on Microstructure and Tensile Properties of Ti-10V-2Fe-3Al.
Technical rept.,
G. T. Terlinde, T. W. Duerig, and J. C. Williams. Apr 80, 14p Rept no. JWTR-8
Contract N00014-76-C-0409

In Ti-10-2-3 a variety of aged microstructures with different volume fractions and morphologies of primary and secondary alpha and also grain boundary alpha has been tensile tested. The results can be summarized as follows: (1) For a constant volume fraction of primary alpha it is possible to vary the yield stress in a wide range; it is also possible to reach comparable yield stress levels for different volume fractions of alpha by an appropriate choice of aging temperatures and times as well as heating up rates to the aging temperatures; (2) Increasing the volume fraction of primary alpha reduces the ductility at comparable yield stresses for the alpha-aged conditions. Only the beta-ST conditions with no primary alpha are an exception. They have lower ductilities than the (alpha + beta) ST conditions. The omega-aged microstructures have the lowest ductilities at comparable yield stresses; (3) The differences in ductilities between the (alpha + beta) ST and alpha-aged, the beta-ST and alpha-aged and the omega-aged microstructures are qualitatively related to different fracture modes; and (4) Microstructures from a different forging which instead of the above tested globular primary alpha have elongated primary show lower ductilities at comparable yield stresses. (Author)

AD-A093 990/0 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Mechanical Engineering.
Determination of the Transverse Properties of ESR 4340 Steel.
Final rept. 3 Aug 78-20 Jun 80,
John T. Berry. Sep 80, 38p AMMRC-TR-80-48
Contract DAAG46-78-C-0045

The objective of the present investigation is to determine the transverse engineering mechanical and fracture toughness properties of electroslag remelted high strength AISI 4340 steel in plate sizes 0.4 inch (10 mm), 1.0 inch (25 mm) and 1-7/8 inch (45 mm) and to correlate these properties with microstructural features. The results of the various tests (Double Ligament, Tensile, and Double Torsion) indicate that the difference between the longitudinal (X) and long transverse (Y) properties of heat 9060 (step-forged 1-7/8 and 1.0 inch plate portions) are at best minor in nature. The same is true with the 0.4 inch-thick cross-rolled ESR 4340 plate (heat 2780). The most significant property differences exist between X and Y direction properties on the one hand and those of through thickness (Z) direction on the other. On comparing the above results with data obtained for heat 9060 at other forging reductions, an increasing sensitivity of ductility (decrease) to increasing reduction is apparent in the Z direction. Scanning Electron Microscope work indicates that the degree of colonization present among the non-metallic inclusions present may be related to the range of ductility-related properties encountered in any particular orientation. (Author)

AD-A093 992/6 PC **A07**/MF **A01**
General Electric Co., Cincinnati, OH.
Crack Growth Modeling in an Advanced Powder Metallurgy Alloy.
Final technical rept. 1 Sep 77-1 Feb 80,
David A. Utah. Jul 80, 145p AFWAL-TR-80-4098
Contract F33615-77-C-5082

An interpolative model has been developed to calculate the cyclic crack growth rate of an advanced aircraft engine disk alloy (AF115). The test variables included within the model consists of stress ratio, temperature, frequency, and hold time. The model was based on experimental results conducted within a statistically designed test program. A nonsymmetric Sigmoidal equation consisting of six independent coefficients was used to equate stress intensity range to cyclic growth rate. Two verification tests were conducted at two conditions other than those used during the development of the model to evaluate the model. (Author)

AECL-6304 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Tensile Properties and Fracture Toughness of Zirconium-8.6 Wt. Percent Aluminum after Fast Neutron Irradiation.
H. E. Rosinger, and B. J. S. Wilkins. Aug 79, 35p
U.S. Sales Only.

The effect of fast neutron irradiation at 600 K on the tensile properties and fracture toughness of the Zr-8.6 wt. percent Al reference material has been studied for fluences up to 2.4 x 10 exp 25 n.m exp -2 (E > 1 MeV). For neutron fluences < 10 exp 25 n.m exp -2 , the yield stress at 573 K increases with fluence and the ultimate tensile strength remains unchanged from the unirradiated value. The plastic elongation decreases with increasing fluence. For neutron fluences > 10 exp 25 n.m exp -2 , all the Zr-8.6 wt. percent Al specimens exhibited an elastic response with no ductility, i.e., they failed in a brittle manner. Fracture toughness decreases with increasing neutron fluence from a value of 73 MPa.msup(1/2) for the unirradiated material to a low of 0.44 to 7.1 MPa.msup(1/2) for specimens irradiated to a fluence of 2.3 x 10 exp 25 n.m exp -2 . These changes in tensile properties are explained in terms of irradiation-induced disordering/amorphousness of th Zr sub 3 Al intermetallic. (Atomindex citation 11:521575)

AECL-6324 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Effect of Fast Neutron Irradation on the Properties of Zr sub 3 Al-Based Alloys: Summary Report.
H. E. Rosinger. Sep 79, 29p
U.S. Sales Only.

The influence of fast neutron irradiation at 600 K on some of the properties of Zr sub 3 Al-based alloys is summarized. The Zr sub 3 Al intermetallic grows under the influence of fast neutron irradiation. The growth exceeds 0.6 percent after a fluence of 2.3 x 10 exp 25 n.m. exp -2 , appears to increase linearly with fluence and shows no sign of saturation. The irradiation growth is recoverable by annealing at 773-973 K. Neutron irradiation influences the mechanical properties. In the 0 to 10 exp 25 n.m exp -2 fluence range there is a significant yield stress increase, a smaller increase in the ultimate tensile strngth and a reduction in the plastic elongation. At fluences above 10 exp 25 n.m exp -2 there is a complete loss of ductility. The plane strain fracture toughness decreases to as low as 0.44 MPa.msup(1/2) at a fluence of 2.3 n.m exp -2 . (Atomindex citation 11:521576)

CEA-CONF-4733 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Irradiation Technics.
G. Farny, and J. P. Genthon. 1979, 12p CONF-790974-2
Specialists meeting on accuracies in correlation between property change and exposure data from reactor pressure vessel steel irradiations, Julich, F.R. Germany, 24 Sep 1979.
U.S. Sales Only.

The technics used to study the parameters involved in steel irradiation are presented: definition of the anticipated experiment - choice of an irradiation location in the reactor - irradiation devices - associated measurements. (Atomindex citation 11:525787)

CEA-CONF-4827 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvetie (France). Dept. des Etudes Mecaniques et Thermiques.
Defect-Vectors and Path Integrals in Fracture Mechanics.
R. L. Roche. 1979, 16p CONF-790802-89
In French.International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

It seems necessary to introduce the J integral without hypothesis on material behavior. The aim of this paper is this introduction and its consequences. Successively are presented: introduction to defect-vectors and defect-momentum, definition of J(K) and J(L) integrals, equilibrium and energy momentum tensor, energetic signification of the path J and L integrals, and local aspects of the criteria based on path integrals. (Atomindex citation 11:525853)

DOE/ER/01198-1325 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Metallurgy and Mining Engineering.

Studies of Hydrogen Embrittlement and Stress-Corrosion Cracking in an Aluminum-Zinc-Magnesium Alloy.
S. W. Ciaraldi, J. L. Nelson, R. A. Yeske, and E. N. Pugh. 1980, 11p
Contract AC02-76ER01198

Tensile tests have been carried out on a high-purity A1-5.6 Zn-2.6 Mg alloy hydrogenated by exposure to moist air. Results indicate that internal hydrogen embrittlement occurs by the formation and rupture of a stress-induced hydride at the grain boundaries. The hydride, identified by electron diffraction as A1H sub 3 , is shown to be unstable in laboratory air, reverting to aluminum. The hydride phase was not detected in specimens failed by SCC, despite evidence that hydrogen is transported ahead of advancing stress-corrosion cracks, and this leads to the possibility that a basically different mechanism may be responsible for SCC in this alloy. (ERA citation 06:006258)

DOE/ET/13513-T4 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Evaluation of Hydrogen Embrittlement in Cr-Mo Pressure Vessel Steels. Topical Report No. 1.
B. J. Shaw, and E. W. Johnson. 24 Aug 80, 36p
Contract AC05-78ET13513

Commercial 2 1/4 Cr-1 Mo low strength steel specimens have been tested to measure their susceptibility to hydrogen embrittlement in an environment of H sub 2 S at 50 psig. It was found that two factors, viz. (1) the plane stress zones on the crack front in compact tension specimens, and (2) incubation time effects, seriously confounded measurements on these steels when tested by conventional rising load experiments. Because of the incubation time effect, K/sub or/ (the stress intensity at which cracking starts in a rising load test) is a loading rate dependent variable and is usually significantly greater than the arrest stress intensity, K/sub arr/ in a bolt loaded test. K/sub arr/ must therefore be used as a measure of hydrogen resistance. The incubation time has been significantly reduced by cyclicly loading in the environment to initiate the crack and K/sub arr/ has been measured by holding the specimen in constant displacement immediately after crack initiation. The plane stress problem has been eliminated by deeply side grooving the compact tension (CT) specimens. As an example of the importance of these effects a 3T CT smooth sided specimen was compared with a side grooved 2T CT specimen of the same steel. Whereas the K/sub or/ value for the smooth 3T was approximately 150 ksi in/sup 1/2/ the K/sub arr/ value for the side notched 2T was approximately 20 ksi in/sup 1/2/. A study of the effect of strength level is included. (ERA citation 06:006260)

IS-M-302 PC **A02**/MF **A01**
Ames Lab., IA.
Preparation of in-Situ Nb sub 3 SN-Cu Wire by Consumable Arc Melting.
J. D. Verhoeven, F. A. Schmidt, E. D. Gibson, J. E. Ostenson, and D. K. Finnemore. 1980, 5p
CONF-800980-33
Contract W-7405-ENG-82
Applied superconductivity conference, Santa Fe, NM, USA, 29 Sep 1980.

Procedures have been developed for casting 10 cm diameter Cu-Nb ingots and for fabricating these castings into Nb sub 3 Sn-Cu in-situ wire. Operating conditions which produce consumable arc cast ingots homogeneous to 1.5 wt % Nb are presented along with analyses of macrosegregation, carbon pickup and Nb dendrite size. Carbon impurity level is found to be an important parameter which controls the critical current. (ERA citation 06:006263)

JAERI-M-8154 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Effect of Thermal Neutron Irradiation on Mechanical Properties of Alloys for HTR Core Applications.
Y. Ogawa, T. Kondo, K. Ishimoto, and T. Ohtsuka. Feb 79, 12p
U.S. Sales Only.

An industrial heat of Hastelloy-X containing 2.3 ppm boron was creep-tested at 900 exp 0 C after irradiating thermal neutrons by 6.6 x 10 exp 20 n/cm exp 2 at temperatures 670 to 880 exp 0 C in JMTR. Significant reduction in rupture life and ductility was observed, and large shift of accelerated deformation stage to short time side was also apparent at comparatively high stresses. Below about 2.2 kg/mm exp 2 , apparent relief from the degradation was seen. The elongation, however, was found to be due to the formation of numerous intergranular cracks in the premature stage of deformation. Based on the post irradiation tensile properties of several industrial alloys the degree of the ductility loss was found to be nearly dependent on the boron content of the alloys. The post irradiation tensile tests for a special low boron grade heat revealed the means of protecting materials from the effect to be feasible. (Atomindex citation 11:524944)

NIIAR-38(397) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Study of Irradiated 15Kh2NMFA Steel Fracture Toughness.
V. K. Shamardin, O. M. Vishkarev, A. M. Pecherin, T. N. Zubova, and N. N. Kobelev. 1979, 15p
In Russian.
U.S. Sales Only.

Described are the experiments on fracture toughness of irradiated 15Kh2NMFA steel melted with both standard and clean charge materials using small-size samples of 13 mm thickness. At the same time the tests on impact toughness were carried out using the standard samples (SST945460 of 4 type). The irradiation temperature was 290 +-15 deg C, fluence - 7x10 exp 19 n/cm exp 2 . After irradiation the fracture toughness of 15Kh2NMFA steel (standard charge) at 20 deg C amounted 264 kg/mmsup(3/2) and decreased up to 100 kg/mmsup(3/2) with test temperature (-180 deg C). Fracture toughness of the irradiated steel melted with clean charge was essentially higher. The investigations have shown that to determine the fracture toughness of the irradiated steel 15Kh2NMFA (standard charge) the small-size samples can be used. (Atomindex citation 11:521581)

N81-15068/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Evaluation of Candidate Stirling Engine Heater Tube Alloys for 1000 Hours at 760 C.
Final rept.,
J. A. Misencik. Nov 80, 35p NASA-TM-81578, E-548
Contract EC-77-A-31-1040

Six tubing alloys were endurance tested in a diesel fired, Stirling engine simulator materials test rig for 1000 hours of 760 C while pressurized at 17 to 21 MPa with either hydrogen or helium. The alloys tested were N 155, A 286, Incoloy 800, 19 9DL, Nitronic 40 and 316 stainless steel. The alloys were in the form of thin wall tubing. Hydrogen permeated rapidly through the tube walls of all six alloys when they were heated to 760 C. Helium was readily contained. Creep rupture failures occurred in four of the six alloys pressurized with hydrogen. Only two alloys survived the 1000 hour endurance test with no failures. Simultaneous exposure to either hydrogen or helium and the combustion environment did not seriously degrade the tensile strength of the six alloys in room temperature or 760 C tests after exposure. Decreases in room temperature ductility were observed and are attributed to aging rather than to hydrogen embrittlement in three of the alloys. However, there may be a hydrogen embrittlement effect in the N 155, 19 9DL, and Nitronic 40 alloys.

N81-15070/8 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Bremen (Germany, F.R.). Inst. fuer Angewandte Materialforschung.
Physical and Mechanical-Technological Properties of Beryllium and Its Alloys Physikalische und Mechanisch-Technologische Eigenschaften von Beryllium und Beryllium Basislegierungen.
W. Vincent, H. Kunze, and G. Frommeyer. 1979, 57p BMVG-FBWT-79-30
In German; English Summary. Sponsored by Bundesmisterium der Verteidigung.

The low specific gravity, the large Young modulus, the relative high melting point and the good resistance against corrosion of beryllium and its alloys are accompanied with excellent thermophysical properties and good reflection characteristics in the IR-spectrums. On the other hand, the brittle behavior at room temperature and the toxic properties make this material difficult to produce and to handle. Metallic impurities and/or berylliumoxid decrease the ductility, increase the hot shortness and favor the grain growth. In principle it is possible to weld, to braze or to adhere beryllium and beryllium alloys with itself and with some other materials. Beryllium is applied for constructions in air and space navigation, for missile material in the military area because it is of excellent stiffness. Furthermore beryllium is used for solution of special problems in thermal, in optical and nuclear measurement technics.

N81-15071/6 PC **A02**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Cadmium, Where and How. le Cadmium, Ou et Comment.
R. Bignolais. 18 Jul 80, 16p SNIAS-801-551-106
Text in French. Presented at a.I.T.E. Congr. Natl. De l'Electrolyse et des Traitements de Surface 16-18 Jun. 1980.

The occasions and limits for using cadmium coatings are discussed as well as the most frequently used processes for applying them. The problem of hydrogen embrittlement is addressed and test methods used to warn of such risks are described.

ORNL-tr-4694 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Corrosion of AISI 316 and AISI 304 Stainless Steel with Iodine Vapor.
T. Fukuda, and S. Omori. 34p
Contract W-7405-ENG-26

The weight loss of stainless steel in corrosion with iodine vapor was studied at 500 to 1000 exp 0 C and an iodine vapor pressure range of 0.05 to 0.5 mm Hg, using a thermobalance. In the initial stage of corrosion, the weight loss rate is largely influenced by solution treatment or surface treatment; the induction period, observed for solution-treated samples, is shortened or eliminated by fission-fragment irradiation, ion-bombardment or mechanical polishing, and in some cases corrosion is even accelerated by the surface treatments. A constant weight loss region follows the initial stage of corrosion. In this region, the weight loss rate is not dependent on treatment to the samples, and has a linear relationship with the vapor pressure of iodine. The rate is the largest at about 800 and 750 exp 0 C for AISI 316 s. s. and AISI 304 s. s. The rates in general are larger for AISI 304 s. s. than for AISI 316 s. s. below 700 exp 0 C but almost the same above 800 exp 0 C. Corrosion product layer is observed on the surface of the sample below 700 exp 0 C. Based on these findings, the corrosion process is discussed. The deposition of corrosion product in a temperature gradient tube is also described. (ERA citation 06:006273)

PATENT-4 202 931
Not available NTIS
Department of Energy, Washington, DC.
Superconducting Articles of Manufacture and Method of Producing Same.
Patent,
L. R. Newkirk, and F. A. Valencia. Filed 23 Sep 74, patented 13 May 80, 8p PAT-APPL-508 586
Supersedes PAT-APPL-508 586-74.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Bulk coatings of Nb sub 3 Ge with high superconducting transition temperatures bonded to metallic substrates and a chemical vapor deposition method for producing such coatings on metallic substrates are disclosed. In accordance with the method, a Nb sub 3 Ge coating having a transition temperature in excess of 21.5 K may be tightly bonded to a copper substrate. (ERA citation 06:005164)

PB81-147134 PC **A04**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Electrochemical Corrosion of Iron-Chromium Alloys Under Ultra-High-Purity Conditions.
Rept. of investigations/1980,
Murray Rosen. 1980, 74p BUMINES-RI-8425

This Bureau of Mines study used rigorously maintained, ultra-high-purity electrochemical systems for in situ characterization of Fe-18Cr surfaces for corrosion studies in well-defined aqueous environments that heretofore were unavailable by normal or conventional laboratory techniques.

PB81-148140 PC **A02**/MF **A01**
Bureau of Mines, Reno, NV. Reno Research Center.
Preparing Rare Earth-Silicon-Iron-Aluminum Alloys.
Rept. of investigations/1980,
J. D. Marchant, E. Morrice, B. P. Herve, and M. M. Wong. 1980, 16p BUMINES-RI-8445

The Bureau of Mines investigated an improved procedure for producing rare earth-silicon alloys. Metallurgical evaluations showed the alloys prepared in this investigation to be as effective in controlling the detrimental effect of sulfur in steel and cast iron as the commercial rare earth-silicon-iron alloys presently used in the steel industry.

PB81-148165 PC **A03**/MF **A01**
Bureau of Mines, Reno, NV. Reno Research Center.
Recovery of Byproduct Heavy Minerals from Sand and Gravel Operations in Central and Southern California.
Rept. of investigations/1980,
J. M. Gomes, G. M. Martinez, and M. M. Wong. 1980, 26p BUMINES-RI-8471

The Bureau of Mines has investigated the occurrence and recovery of by-product heavy minerals from sand and gravel operations as a means of assessing the Nation's resources. Sand samples from 63 locations in central and southern California were treated to yield heavy mineral concentrates. The mineral compositions of the concentrates were characterized by chemical and mineralogical examinations. Additional large quantities of concentrates were prepared from selected deposits that contained significant quantities. Beneficiation studies were performed on these concentrates to recover individual mineral products. Gold was recovered by amalgamation; platinum-group metals and radioactive minerals by flotation; magnetite, ilmenite, and chromite by magnetic and high-tension separation techniques.

PB81-148223 PC **A03**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Metallurgy Research Center.
Characterization of Alloys Formed by Ion Implantation.
Rept. of investigations/1980,
B. D. Sartwell, A. B. Campbell, III, B. S. Covino, Jr., and P. B. Needham, Jr. 1980, 36p BUMINES-RI-8434

The formation of alloyed regions near the surface of metals using ion implantation is being investigated by the Bureau of Mines as a means of providing corrosion resistance using much smaler amounts of the strategic alloying metals. Two ion implantation systems that can implant low-energy chromium, nickel, or aluminum ions into low-cost substrate materials such as iron or carbon steel have been designed and constructed. The development of the ion source, ion beam acceleration stage, mass analysis system, and target chamber are described in detail. The ion-implanted alloys have been characterized using proton-induced x-ray emission to give the total number of atoms implanted and to determine the extent of any surface contamination introduced by the ion implantation process. Research conducted at other laboratories on metallurgical applications of ion implantation is given.

PB81-148397 PC **A04**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Availability of Critical Scrap Metals Containing Chromium in the United States. Wrought Stainless Steels and Heat-Resisting Alloys.
Information circular/1980,
Charles L. Kusik, Harry V. Makar, and Michel R. Mounier. 1980, 59p BUMINES-IC-8822
Contract J0188170

A two-part study was conducted for the Bureau of Mines, to assess the domestic availability of critical metals in scrap containing significant amounts of chromium. This report describes the part of the study that deals with wrought stainless steels and heat-resisting alloys.

PB81-150013 PC **A02**/MF **A01**
Bureau of Mines, Reno, NV. Reno Research Center.
Recovery of Gold from Arsenopyrite Concentrates by Cyanidation-Carbon Adsorption.
Rept. of investigations/1980,
H. J. Heinen, G. E. McClelland, and R. E. Lindstrom. 1980, 16p BUMINES-RI-8458

The Bureau of Mines investigated a cyanidation-carbon adsorption technique for extracting gold from arsenopyrite concentrates. Agitation leach experiments were conducted on 85-pct-minus-35-mesh gravity concentrates containing 21.8 oz gold and 6.4 oz silver per ton. Results obtained in leaching the concentrates showed that 96.9 pct gold and 90.7 pct silver extraction could be achieved in 96 hours of agitation. Gold and silver were recovered from the resulting pregnant solution by exposure to granular activated carbon in a countercurrent system. Carbon loadings of 2,556 oz of gold and 502 oz of silver per ton were achieved. These loadings are significantly higher than heretofore thought practical.

PB81-150021 PC **A03**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Silver Recovery from Aircraft Scrap.
Rept. of investigations/1980,
D. Harry Chambers, and B. W. Dunning, Jr. 1980, 29p BUMINES-RI-8477

The Bureau of Mines conducted research to recover silver from aircraft scrap. Silver was recovered by an electrolytic method from stainless steel honeycomb sections separated from the aircraft. These sections had been constructed by sandwiching a stainless steel honeycomb core between stainless steel sheets and then brazing the assembly with a silver alloy. Over 300 pounds of silver was used in the B-58 bomber, concentrated in certain honeycomb sections of the aircraft. Following shredding of the aircraft parts, an average of 95 percent (ranging 67 to 100 percent) of the silver was recovered in a single electrorefining step. After the electrorefined product was magnetically cleaned, purity of the recovered silver was greater than 99.3 percent.

PB81-150153 PC **A03**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Iron-Base Alloys Strengthened by Laves Phases as Substitutes for Stainless Steels.
Rept. of investigations/1980,
J. S. Dunning, M. L. Glenn, and W. L. O'Brien. 1980, 30p BUMINES-RI-8470

Precipitation-hardening, iron-base alloys containing molybdenum and titanium was studied as substitutes for the high-tonnage stainless steels that are high in imported nickel and chromium. The precipitation-hardened iron-base alloys are strengthened by a dispersion of the ternary Laves phase, Fe2 (Mo, Ti). Aluminum and chromium additions changed the solid solubility limits of molybdenum and titanium in alpha-iron and affected the composition of precipitating phases. A baseline composition of Fe-7Mo-2Ti was selected to study the effects of aluminum and chromium additions on the precipitation-hardening mechanism and microstructure and was also used in studies of mechanical properties and oxidation resistance.

PB81-150161 PC **A02**/MF **A01**
Bureau of Mines, Twin Cities, MN. Twin Cities Research Center.
Utilizing the Magnetic Fraction of Raw Refuse with Shredded Automobile Scrap in Cupola Gray Iron.
Rept. of investigations/1980,
V. R. Spironello, and W. M. Mahan. 1980, 25p BUMINES-RI-8454

In this investigation, cupola trials were made using combinations of refuse scrap with shredded automobile scrap under basic and acid slag practices. Furnace operating information and the behavior of alloying and tramp elements was obtained. The research showed that it is possible to utilize up to 60 percent refuse scrap in the cupola under basic practice and 30 percent under acid practice.

PB81-803223 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Stress Corrosion of Stainless Steels. 1974-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1974-Nov 79.
Feb 81, 340p

Worldwide research on stainless steel stress corrosion and stress corrosion resistant steels are covered in this report. Stress corrosion cracking and fatigue are studied. In addition, studies on electrochemistry, phase studies, environments, processing, and testing are included. Stainless steel performance in chemical plants, nuclear reactors, and biological implants is discussed. (This updated bibliography contains 333 citations, none of which are new entries to the previous edition.)

PB81-803231 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Stress Corrosion of Stainless Steels. December, 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for Dec 79-Jan 81.
Feb 81, 142p
Supersedes PB80-803190, and NTIS/PS-78/1339. See also 1964-1976, NTIS/PS-78/1338.

This compilation covers research on deformation, cracking, electrochemistry, additives, kinetics, test methods and solutions in relation to stress corrosion. A majority of the research concerns nuclear reactor materials, spacecraft components, and coal gasification plants. Design criteria and corrosion resistance are also discussed. (This updated bibliography contains 135 citations, 24 of which are new entries to the previous edition.)

PB81-803249 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Stress Corrosion of Stainless Steels. December, 1979-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for Dec 79-Jan 81.
Feb 81, 102p
Supersedes PB80-803208, and NTIS/PS-78/1340. See also 1970-1973, NTIS/PS-76/1017.

Worldwide research on stainless steel stress corrosion and stress corrosion resistant steels are covered in this report. Stress corrosion cracking and fatigue are studied. In addition, studies on electrochemistry, phase studies, environments, processing, and testing are included. Stainless steel performance in chemical plants, nuclear reactors, and biological implants is discussed. (This updated bibliography contains 95 citations, all of which are new entries to the previous edition.)

PB81-803272 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Powder Metallurgy of Iron. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 266p
Supersedes PB80-803232, and NTIS/PS-78/1327.

These citations of Federally-funded research reports cover ferrous metal powder compacting, pressing, sintering, and fabrication. Properties are discussed in relation to processing. (This updated bibliography contains 258 citations, 33 of which are new entries to the previous edition.)

PB81-803280 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Powder Metallurgy of Iron. January, 1978-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for Jan 78-Nov 79.
Feb 81, 270p

Worldwide journal research is cited on compacting, sintering, pressing, forming, forging, and fabrication of ferrous metal powders. Mechanical properties, physical properties, and structure of powdered iron and steel products are also reported. Abstracts of research on iron powder production are included. (This updated bibliography contains 261 citations, none of which are new entries to the previous edition.)

PB81-803298 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Powder Metallurgy of Iron. December, 1979-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for Dec 79-Jan 81.
Feb 81, 155p
Supersedes PB80-803240, and NTIS/PS-78/1329. See also 1975, NTIS/PS-76/0991, and 1976-1977, NTIS/PS-78/1328.

Worldwide journal research is cited on compacting, sintering, pressing, forming, forging, and fabrication of ferrous metal powders. Mechanical properties, physical properties, and structure of powdered iron and steel products are also reported. Abstracts of research on iron powder production are included. (This updated bibliography contains 146 citations, all of which are new entries to the previous edition.)

PB81-803306 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Powder Metallurgy of Aluminum. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 206p
Supersedes PB80-803216, and NTIS/PS-78/1310.

The citations cover Government-sponsored research involving aluminum and aluminum alloy powder compaction, pressing, sintering, joining, and heat treatment. Studies on mechanical properties and structure are included; the Fabrication and testing of products are also cited. (This updated bibliography contains 197 citations, 5 of which are new entries to the previous edition.)

PB81-803314 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Powder Metallurgy of Aluminum. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 325p
Supersedes PB80-803224, and NTIS/PS-78/1311.

Worldwide research on powder metallurgy of aluminum and aluminum alloys are cited in the bibliography. Studies on sintering, pressing, fabrication, dispersion hardening, compacting, and testing are included. Processes such as welding, reinforcement, and powder production are also covered. (This updated bibliography contains 316 citations, 9 of which are new entries to the previous edition.)

PB81-859241 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Aging of Nickel Base Alloys. January, 1976-January, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jan 81.
Feb 81, 85p NERACEDBNT3144

This retrospective bibliography covers information on the aging of nickel base alloys. Changes in physical properties as a function of aging are discussed, as are the methods used to effect the aging process. (Contains 72 citations, fully indexed and including a table of contents.)

SAND-80-8656 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
Hydrogen Trapping in FCC Metals.
G. J. Thomas. Oct 80, 20p CONF-800850-3
Contract AC04-76DP00789
International conference on effects of hydrogen on materials, Jackson Lake Lodge, WY, USA, 26 Aug 1980.

Desorption measurements have been employed to study trapping in cold-worked and impurity-doped nickel. The data was analyzed using numerical solutions to diffusion models to obtain trap binding energies. The present results, as well as literature data, indicate low binding energies relative to bulk diffusional activation energies in nickel and austenitic steels, in contrast to the ferritic case. This suggests that enhancement of hydrogen concentrations at trap sites may not be very large. The small binding energies to defect strain fields indicate that hydrogen in solution induces a small lattice relaxation in these metals. (ERA citation 06:006266)

UCRL-84358 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Acoustic Emission under Biaxial Stresses in Unflawed 21-6-9 and 304 Stainless Steel.
M. A. Hamstad, E. M. Leon, and A. K. Mukherjee. 31 Oct 80, 36p CONF-801221-1
Contract W-7405-ENG-48
Elastic waves and microstructures conference, Oxford, UK, 16 Dec 1980.

Acoustic emission (AE) testing has been carried out with uniaxial and biaxial (2:1 stress ratio) stressing of smooth samples of 21-6-9 and 304 stainless steel (SS). Uniaxial testing was done with simple tensile and compression samples as well as with the special biaxial specimens. Biaxial tensile stressing was accomplished with a specially designed specimen, which had been used previously to characterize AE in 7075 aluminum under biaxial stressing. Results were obtained for air-melt and for vacuum-melt samples of 21-6-9 SS. The air-melt samples contain considerably more inclusion particles than the vacuum-melt samples. For the 304 SS, as received material was examined. To allow AE correlations with microstructure, extensive characterization of the 21-6-9 microstructure was carried out. Significant differences in AE occur in biaxially stressed specimens as compared to uniaxially stressed samples. 15 figures, 3 tables. (ERA citation 06:006267)

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A093 655/9 PC **A03**/MF **A01**
National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engineering.
Properties of Base Stocks Obtained from Used Engine Oils by Acid/Clay Re-refining (Proprietes des Stocks de Base Obtenus par Regeneration des Huiles a Moteur Usees par le Procede de Traitement a l'Acide et a la Terre),
P. L. Strigner, G. Moroz, R. Sabourin, G. Burton, and T. Bailey. Sep 80, 44p DME-MP-75, NRC-18719
Summary in French.

Owing to limited laboratory facilities of Canadian re-refineries, the NRC Fuels and Lubricants Laboratory has providing a service to re-refiners by evaluating in the laboratory their products, including feedstocks, base stocks (or base oils) and finished lubricating oils. This service has been available since 1967. In recent years it has been extended to oil reclaimers generally so that reclaimed industrial, and hydraulic oils have been examined as well (Refs. 1 and 2). Regrettably, because of other commitments and absence of some equipment the evaluations have not been as thorough as desirable. For example, except for standard single cylinder engine tests on a number of re-refined engine oils in the late sixties, rig and field tests on finished products have not been done. Nevertheless , it is believed, that the tests that have been carried out have been valuable. Individual reports showing the test results were sent to respective re-refiners whose oils were tested. Principally, re-refined oils obtained by the conventional acid/clay process (Appendix A) and samples sent by the re-refiner to the Fuels and Lubricants Laboratory were tested. However, a number of experimental base stock oils were examined from Canadian experiments employing a variety of processes including vacuum distillation, hydro-treatment, solvents and chemicals. (Author)

N81-15106/0 PC **A06**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Surface Temperatures and Glassy State Investigations in Tribology, Part 4.
Final rept.,
S. S. Bair, and W. O. Winer. Jan 81, 119p NASA-CR-3368
Grant NSG-3106

Measurements were made of the limiting shear stress for two naphthenic oils of differing molecular weight and three blends of the lower molecular weight oil and polyalkylmethacrylate polymers of differing molecular weight. The two base oils reached the same limiting shear stress for the same temperature and pressure. This was also true for all the polymer solutions although the polymer reduced the limiting shear stress by about 15 percent. It is shown that limiting stress is more a function of material type than viscosity or molecular weight. A new falling body viscometer was constructed to operate to 230 C and 0.6 GPa. Another viscometer was constructed to extend the pressure range to 1.1 GPa. A concentrated contact simulator was developed which allows recording of the traction force while the slide-roll ratio is continuously varied and the rolling speed is maintained essentially constant by a single drive motor. The configuration is that of a crowned roller against a disk. Measurement of lubricant minimum film thickness of elliptical EHD contacts of various aspect ratios were made by optical interferometry. The data collected were used to evaluate the Hamrock and Dowson minimum film thickness model over a range of contract ellipticity ratio where the major axis of the contact ellipse was aligned both parallel and perpendicular to the direction of motion. A statistical analysis of the measured film thickness data showed that on the average the experimental data were 30 percent greater than the film thickness predicted by the model. Preliminary development of the application of a scanning infrared radiation system to a tribosystem was completed.

11I. Plastics

AD-A093 547/8 Not available NTIS
University of Southern California, Los Angeles. Dept. of Chemistry.
Evaluation of the Stress-Relaxation Modulus for Materials with Rapid Relaxation Rates.
K. S. C. Lin, and J. J. Aklonis. 1980, 6p ARO-16662.4-C
Contract DAAG29-79-C-0167
Availability: Pub. in Jnl. of Applied Physics, v51 n10 p5125-5130 Oct 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 820/9 PC **A05**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Determination of Crosslinking in High Tg Polymers.
Final technical rept. 5 Oct 77-15 Oct 79,
A. Schindler, and N. Morosoff. Jul 80, 94p
AFWAL-TR-80-4085
Contract F33615-77-C-5195

Considerable evidence has been accumulated by different investigators which demonstrates that the crosslink density in cured epoxy resins is not uniform. The non-uniformity of the network density can be so pronounced that the system approaches a two-phase system being composed of a large number of densely crosslinked domains of globular shape (nodules or network clusters) which are imbedded in a common matrix of lower crosslink density. Most of the evidence for nodule formation in cured epoxy resins is derived from electron microscopic investigations of fracture surfaces by replication technique. Generally, the micrographs

reveal the presence of globular domains with dimensions in the range of 10-70 nm. So far the existence of nodular structures could not be confirmed by x-ray scattering experiments. In view of the accumulated evidence for the presence of globular network inhomogeneities the lack of x-ray evidence would indicate an extremely small difference between the electron densities of nodules and imbedding matrix material. As a consequence the evaluation of x-ray particle scattering becomes experimentally rather demanding.

AD-A093 879/5 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Step-Growth Propagation of High Molecular Weight Rigid Rod Polymers.
Final technical rept.,
James F. Wolfe. 15 Dec 80, 30p AFOSR-TR-80-1370
Contract F49620-78-C-0110

The synthesis of two isomeric poly(benzothiazoles) via the self-polycondensation of two isomeric (o-aminomercapto)benzoic acids was investigated. Poly(2,6-benzothiazole) was prepared from 4-amino-3-mercaptobenzoic acid in polyphosphoric acid at concentrations of 3 to 10%. Intrinsic viscosities between 3 and 4.6 dL/g in methanesulfonic acid were obtained. The purity of the requisite monomer for poly(2,5-benzothiazole), namely, 3-amino-4-mercaptobenzoic acid, was not sufficient to obtain high molecular weight polymer. The polymers are candidate matrix resins for molecular composites with the rigid rod polymer, poly(p-phenylene benzobisthiazole) (PBT). (Author)

AD-B034 190/9 PC **A02**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Annapolis, MD. Ship Materials Engineering Dept.
Outgassing of High-Temperature-Resistant Organic Polymeric Materials for Possible Shipboard Use.
Final rept. Jan 77-Jan 78
Peter Demas. Feb 79, 19p Rept no. DTNSRDC/SME-78/5
Distribution limitation now removed.

Four polymeric materials, polyphenylene oxide, polyquinoline, acetylene substituted polyimide, and polybenzimidazole, reported to possess high-tempeature resistance, were investigated in order to determine their outgassing characteristics as related to their suitability for shipboard applications. The materials were sequentially exposed to 150, 250, and 450 C for 3-hour periods and the types and amounts of their outgassed products were determined. The amounts of outgassed products were small from polyquinoline, acetylene substituted polyimide, and polybenzimidazole. It was concluded that those materials would be suitable for use in shipboard applications where high-temperature resistance (up to 450 C) is required, providing that normal ventilation is available. The quantity of outgassed products from polyphenylene oxide was too great to consider that material suitable for shipboard applications requiring high-temperature resistance. (Author)

PB81-858276 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Inorganic Polymers. January, 1970-January, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 70-Jan 81.
Jan 80, 112p

This retrospective bibliography contains citations on inorganic polymers such as phosphonitriles, phosphinates, polyphosphazines, carboranes siloxanes and silica filled silicones. (Contains 99 citations, fully indexed and including a table of contents.)

PB81-858284 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Inorganic Polymers. January, 1976-January, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jan 81.
Jan 80, 62p NERACEDBNT3007

This retrospective bibliography contains citations on inorganic polymers such as phosphonitriles, phosphinates, polyphosphazines, carboranes, siloxanes and silica filled silicones. (Contains 50 citations, fully indexed and including a table of contents.)

PB81-858292 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Inorganic Polymers. January, 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Jan 81.
Jan 80, 68p

This retrospective bibliography contains citations on inorganic polymers such as phosphonitriles, phosphinates, polyphosphazines, carboranes, siloxanes and silica filled silicones. (Contains 54 citations, fully indexed and including a table of contents.)

11J. Rubbers

PB81-135303 Not available NTIS
National Bureau of Standards, Washington, DC.
A Theory of Effects of Pressure on Finite Elastic Shear,
B. Bernstein, and E. A. Kearsley. 1980, 7p
Pub. in Proceedings of the International Congress on Rheology (8th) Held at Naples, Italy on Sep 1-5, 1980, Paper in Rheology 1, p305-311 1980.

Often the theory of finite deformations of an elastic medium is used with the added restriction of incompressibility of the medium. This restriction makes possible the solution of several classes of problems in terms of an unspecified strain-energy potential, however, it excludes the possibility that the elastic material properties depend on pressure. In this paper, a general theory of materials whose mechanical properties depend on pressure will be derived from the unrestricted theory and the condition for incompressibility of the medium will be added as an approximation.

PB81-149015 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Friction Between Shoe - Sole Materials and Roofing Boards.
Technical rept.,
T. Szabo, and A. J. Nanassy. 1979, 15p TR-503E
Also pub. as ISSN-0709-4523. Abstract in English and French.

Kinetic frictions of boot-sole materials upon roofing boards were determined by the horizontal sliding method. Kinetic frictions of several kinds of roofing boards on roofing boards were also found. The friction was expressed as coefficient of friction and as angle of response. A statistical analysis shows that there are significant differences between means in terms of sole materials and surface treatments of boards. Neoprene or rubber soles are the safest available for workers on sloping wooden roofs.

11L. Wood and Paper Products

PB81-148538 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Industrial Trials with Ammoniacal Preservatives. III. Copper-Arsenic-Additive and Copper-Zinc-Arsenic-Additive with Douglas-Fir Plywood.
Technical rept.,
J. Krzyzewski, J. Rak, T. Szabo, and M. Hulme. 1979, 14p TR-501E
Also pub. as ISSN-0709-4523. Summary in English and French.

Two ammoniacal preservatives, copper-arsenic-additive (CAA) and copper-zinc-arsenic-additive (CZAA) - developed at the Eastern Forest Products Laboratory for difficult-to-penetrate wood species - were tested in a commercial treating plant on Douglas-fir plywood. The treatment schedule comprised steaming for 1.5 or 2.75 h followed by a standard full-cell treatment for 1.5 or 4 h. There was little strength loss due to treatment and no evidence of wood collapse.

PB81-148546 PC **A03**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Flexural Properties of Waferboard.
Technical rept.,
T. Szabo. 1980, 27p TR-505ER
Also pub. as ISSN-0709-4523. Summary in English and French.

The bending properties of waferboards were determined using two different testing methods. The results have shown that the two test methods cannot be considered interchangeable. One of them -- panel testing -- gave consistently higher stiffnesses and lower strengths than the standard test method. The difference between these properties can mainly be attributed to the effect of specimen size. The appropriate bending properties from the two methods were found to have a linear correlation.

PB81-149023 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Ponding as an Industrial Tool for Improving the Permeability of White Spruce Poles to Creosote.
Technical rept.,
J. Krzyzewski. 1979, 22p TR-516ER
Also pub. as ISSN-0709-4523. Summary in English and French.

White spruce poles which had been debarked and floated in fresh water for 12 weeks and air-seasoned for 13 months, were permeable throughout the sapwood to creosote impregnation by a pressure process. Treatments were carried out on a commercial scale in Newfoundland. Other poles which had been ponded with bark, sprinkled continuously, or air-seasoned were not uniformly penetrated. The order of effectiveness of the different methods of field-conditioning on a comparative scale is given.

PB81-150542 PC **A03**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Rubans Anti-Fentes Pour Placages Verts (Green Veneer Reeling Type),
Maynard Dokken. 1979, 36p 514FR
Also pub. as ISSN-0709-4523. Text in French.

This report covers the information contained in the information report 'A Survey of Green Veneer Taping' (1971), and 'Some Practical Considerations on Taping Green Veneer' (1971). Matters discussed include technical and economic aspects of placement of tapes as well as problems involved in the use of this method. The study of costs has been provided through information from companies that distribute tapes.

PB81-151011 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
Reduced Boiling and Cooling Times for the Waferboard Bending Test.
Technical rept.,
P.C.L. Gaudert, and T. Szabo. 1980, 13p TR-536E
Also pub. as ISSN-0709-4523. Errata sheet inserted. Abstract in English and French.

The boiling and cooling limits recommended by Canadian Waferboard Standard (CAN-0188.0-M78) are too long for efficient in-plant quality control. For this reason a systematic study has been conducted to determine whether test results obtained after reduced treatment times would correlate with results obtained after the standard procedure. The outcome of the study surpassed the anticipated correlation by showing practical equality between results obtained after 5, 10, 20 min and the standard 2 hours boil time. The same results were found for the 10 min and standard one hour cooling times. A shortened treatment, say 10 minutes boiling and 10 minutes cooling, can be recom-

mended as saving time and giving results indistinguishable from the standard method.

PB81-152068 PC **A02**/MF **A01**
Forintek Canada Corp., Ottawa (Ontario). Eastern Forest Products Lab.
A Comparison of Hand Nailed, Machine Nailed, and Airgun Nailed Pallet Joints.
Technical rept.,
J. R. Reeves. 1979, 25p TR-515ER
Also pub. as ISSN-0709-4523.

The paper compares the effects of hand nailing, machine nailing and air gun nailing on the delayed joint separation resistance of pallet joints nailed up in both the green and kiln dried conditions. It was found that the maximum applied load to failure was increased among the joints constructed by air gun nailing and that a greater amount of nail pullout and nail head pullthrough occurred among those samples nailed up in the green condition.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A093 445/5 PC **A02**/MF **A01**
South Carolina Univ., Columbia. Dept. of Mathematics and Statistics.
Stability of Linear Forms in Independent Random Variables in Banach Spaces.
Interim rept.,
Joe Howell, Robert L. Taylor, and Wojbor A. Woyczynski. Nov 80, 19p TR-67, AFOSR-TR-80-1297
Contract F49620-79-C-0140
Prepared in cooperation with Cleveland State Univ., OH. Dept. of Mathematics.

In the present paper we study the almost sure stability and the stability in probability of linear forms in independent random vectors taking values in a real separable Banach space E.

AD-A093 510/6 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Statistics.
Adaptive Designs in Attribute Life Testing.
Technical rept.,
Mohammad Kazim Khan. 15 Sep 80, 26p Rept no. VPI-TR-3
Contract N00014-80-C-0325

The study is concerned with the problem of adaptively determining the (surveillance) observation epochs for the purpose of estimating the parameter(s) of a life distribution under attribute life testing. A discrete adaptive procedure is developed and proved to be epsilon-optimal under the criterion of maximizing the Fisher information function. (Author)

AD-A093 518/9 Not available NTIS
City Coll., New York.
Curvilinear Path Steplength Algorithms for Minimization Which Use Directions of Negative Curvature,
Donald Goldfarb. 16 May 78, 11p ARO-14180.5-M
Grant DAAG29-77-G-0114
Availability: Pub. in Mathematical Programming, v18 p31-40 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 520/5 Not available NTIS
Stanford Univ., CA.
Infinite Retrogression in the Eaves-Saigal Algorithm,
Peter S. Brooks. 27 Mar 79, 16p ARO-152454.12-M
Grants DAAG29-78-G-0026, NSF-MCS77-05623
Availability: Pub. in Mathematical Programming, v19 p313-327 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 525/4 Not available NTIS
City Coll., New York.
Worst Case Behavior of the Steepest Edge Simplex Method,
Donald Goldfarb, and William Y. Sit. 26 Oct 80, 6p ARO-14180.4-m
Grant DAAG29-77-G-0114
Availability: Pub. in Discrete Applied Mathematics, v1 p277-285 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 543/7 PC **A03**/MF **A01**
White Sands Missile Range, NM.
Robust Filtering and Smoothing via Gaussian Mixtures.
Technical rept.,
William S. Agee, and Barbara A. Dunn. Dec 80, 34p Rept no. WSMR-TR-73

Robust methods provide a fresh approach to the treatment of outliers in filtering and smoothing applications. In deriving the filter and smoother equations via the conditional mean formulation or maximum a posteriori formulation the measurement noise probability density is replaced by a pseudo density which is Gaussian mixture with very heavy tails. The resulting robust filter and smoother are applied to tracking data to obtain improved estimation performance in the presence of outliers. The improvement in estimation performance is evaluated by Monte Carlo using simulated tracking data. The Monte Carlo results indicate the improvement in performance to be somewhat greater than the improvement obtained when using robust filters and smoothers derived from M-estimates. (Author)

AD-A093 545/2 Not available NTIS
Iowa State Univ., Ames.
Asymptotic Properties of Linear Functions of Order Statistics for Non-Stationary Mixing Processes,
David A. Sotres, and Malay Ghosh. 1978, 20p ARO-16137.11-M
Contract DAAG29-79-C-0083
Availability: Pub. in Calcutta Statistical Association Bulletin, v28 n109-112 p19-36 Mar-Dec 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 558/5 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Industrial and Systems Engineering.
Interior Analysis of the Observations in Multiple Linear Regression.
Technical rept. 1 Apr 79-1 Oct 80,
Douglas C. Montgomery, Edith W. Martin, and Elizabeth A. Peck. 1980, 10p
Contract N00014-78-C-0312
Pub. in Jnl. of Quality Technology, v12 n3 p165-173 Jul 80. Prepared in cooperation with The Coca-Cola Co., Atlanta, GA.

No abstract available.

AD-A093 562/7 PC **A18**/MF **A01**
Army Research Office, Research Triangle Park, NC.
Transactions of the Conference of Army Mathematicians (26th) Held at Hanover, New Hampshire on 10 - 12 June 1980.
Jan 81, 405p Rept no. ARO-81-1

Contents: Direct and Inverse Methods for Scattering by Cracks in the High Frequency Range; Solitary Waves and Shock Profiles in the Three-Dimensional Lattice; Traveling Wave Solutions of a Model System for Flame Propagation; Development of Deflagration on Initially Cold Combustibles; Mathematical Questions from Combustion Theory; Note on the Stability of Stochastic Reaction-Diffusion Equations; Computer Aided Analysis of Mechanical Systems with Intermittent Motion; Applications of Delay Feedback in Control Systems Design; An Adaptive Lead Prediction Algorithm for Maneuvering Target Engagement; On Volterra Integral Equations of Pulse-Convolution Type; Cubic Splines and Approximate Solution of Singular Integral Equations; Influence-Function Approach to the Solution of the Deflection of a Floating Elastic Plate and Nonuniqueness of the Solutions; Cyclic Stress-Strain Behavior Near a Narrow Elliptical Flaw; Elastic-Plastic Analysis of Screw Threads; Generalized Plane-Strain Problems in an Elastic-Plastic Thickwalled Cylinder; Quadratic and Cubic Transition Elements; Perturbation and Bifurcation in a Free Boundary Problem; and HOPF Bifurcation Computations for Distributed Parameter Systems.

AD-A093 563/5 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
The Ubiquitous Role of f'/f in Efficiency Robust Estimation of Location.
Technical summary rept.,
Brian L. Joiner, and David L. Hall. Aug 80, 41p Rept no. MRC-TSR-2102
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

This paper is primarily expository in nature and focuses on the all pervasive importance of f'/f in efficient estimation of location, with primary emphasis on the role of f'/f in robust estimation. Connections between M estimators (maximum likelihood-like), R (rank) estimators and L estimators (linear combinations of order statistics) are discussed and an alternative heuristic explanation of f'/f is given showing why it is an intuitively reasonable quantity on which to base estimation. The asymptotic relative efficiency of each class of estimators is shown to be the square of a correlation coefficient related to f'/f and reasons are given as to why R estimators might often prove to have superior robustness properties relative to L and M estimators. (Author)

AD-A093 564/3 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Theorem Concerning Uniform Simplification at a Transition Point and the Problem of Resonance.
Technical summary rept.,
Yasutaka Sibuya. Aug 80, 30p Rept no. MRC-TSR-2103
Contract DAAG29-80-C-0041, Grant NSF-MCS79-01998

In a certain situation which arises naturally in applications Lim V as epsilon approaches 0 (x, epsilon) = 0 identically for practically all the solutions v of (1), except when F and G are related in a specific way. This exceptional case is called the case of resonance. It is important to find an effectively computable condition for the resonance. B. J. Matkowsky found such a condition. However, so far, it has been mathematically very difficult to prove that the Matkowsky-condition actually guarantees the resonance. The difficulty is due to the fact that a quantity which is decisive in determining the resonance is so small that any existing mathematical tool has failed to dig this quantity out of the differential equation clearly. In this work, we shall provide such a tool.

AD-A093 565/0 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Evaluation of Complex Logarithms and Related Functions.
Technical summary rept.,
George J. Miel. Aug 80, 18p Rept no. MRC-TSR-2104
Contract DAAG29-80-C-0041

An algorithm is presented for computing ln z with complex arithmetic, by extending to the complex plane Carlson's treatment of a classical iteration using arithmetic and geometric means. Although not competitive with current techniques which handle the real and imaginary parts separately, the algorithm may be useful in special purpose applications. A detailed analysis of convergence, scaling, and roundoff is given. Standard identities and some minor bookkeeping allow the evaluation of

inverse circular and inverse hyperbolic functions. It is also shown that the basic procedure is related to certain real algorithms. (Author)

AD-A093 566/8 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Bounds for the t-Tail Area for Arbitrary Degrees of Freedom.
Technical summary rept.,
Andrew P. Soms. Aug 80, 15p Rept no. MRC-TSR-2105
Contract DAAG29-80-C-0041

The bounds of Birnbaum (1942) and Sampford (1953) for the upper tail area of the normal distribution are extended to the upper tail of the t-distribution for arbitrary real degrees of freedom. This generalizes the results of Soms (1977a) for integral degrees of freedom. Numerical and theoretical comparisons are made with the bounds of Peizer and Pratt (1968), Wallace (1959) and Soms (1977b). (Author)

AD-A093 567/6 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Note on an Extension of Rational Bounds for the t-Tail Area to Arbitrary Degrees of Freedom.
Technical summary rept.,
Andrew P. Soms. Aug 80, 11p Rept no. MRC-TSR-2106
Contract DAAG29-80-C-0041

Real degrees of freedom arise in the modification of the two-sample t-test when the variances cannot be assumed to be equal. For small degrees of freedom both linear interpolation and standard computer routines may be unsatisfactory. The present paper provides a simple technique for satisfactory estimates of tail probabilities. (Author)

AD-A093 568/4 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Extremal Polynomials with Application to Richardson Iteration for Indefinite Linear Systems.
Technical summary rept.,
Carl de Boor, and John R. Rice. Aug 80, 30p Rept no. MRC-TSR-2107
Contract DAAG29-80-C-0041, Grant NSF-MCS77-01408

The application of Richardson iteration to a symmetric, but indefinite linear system requires certain parameters which can be determined from the zeros in the error of a certain best polynomial approximant on some set S known to contain the spectrum of the coefficient matrix. It is pointed out that this error can also be obtained as a multiple of the extremal polynomial for the linear functional p at p(0), and this leads to an efficient Remes type algorithm for its determination. A program incorporating this algorithm for the case that S consists of two intervals bracketing zero is also given. (Author)

AD-A093 569/2 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Generalization of the Kreiss Matrix Theorem.
Technical summary rept.,
Shmuel Friedland. Aug 80, 15p Rept no. MRC-TSR-2108
Contract DAAG29-80-C-0041

In the early sixties H. O. Kreiss, while studying stability of numerical schemes for partial differential equations, considered a generalization of a problem. Namely, given a set A of n x n complex valued matrices, when all powers of A epsilon A are uniformly bounded. These sets - called the stable sets - were completely characterized by Kreiss by giving three equivalent conditions. In this paper we consider alpha-stable sets A (alpha greater than 0), such that for any A epsilon A the powers A to the Nu power are uniformly bounded by K nu to the alpha power. We generalize the Kreiss resolvent condition for alpha-stable sets. It seems that alpha-stable sets are related to the concept of weakly stable numerical schemes for partial differential equations.

AD-A093 570/0 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Parabolic Capacity and Sobolev Spaces.
Technical summary rept.,
Michel Pierre. Aug 80, 21p Rept no. MRC-TSR-2109
Contract DAAG29-80-C-0041, Grant NSF-MCS78-09525

In recent years, parabolic variational inequalities (V.I.) have been intensively developed in a functional analytic setting involving many function spaces. As in the case of elliptic V.I., the tools of potential theory have also proven to be most useful for solving and interpreting parabolic V.I. Several facts exhibit a close relationship between the functional analytic and potential theoretic approaches. Among them is the result provided in this paper. Let us describe its content. Just as for the Laplacian operator, a capacity had been associated with the heat operator in order to solve various problems in potential theory. On the other hand, functional spaces - mainly Sobolev spaces, had been introduced to solve variational inequalities involving the heat operator. We prove here that this capacity can be defined in terms of the topology naturally induced by these functional spaces. This leads to interesting new results for parabolic variational inequalities. (Author)

AD-A093 572/6 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Sharp Existence Results for a Class of Semilinear Elliptic Problems.
Technical summary rept.,
H. Berestycki, and P. L. Lions. Aug 80, 20p Rept no. MRC-TSR-2111
Contract DAAG29-80-C-0041

In this paper a semilinear elliptic second-order problem is considered. Under very general assumptions we give a precise description of the number of solutions of the problem.

AD-A093 573/4 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Two-Level Multifactor Experiment Designs for Detecting the Presence of Interactions.
Technical summary rept.,
Max D. Morris, and Toby J. Mitchell. Aug 80, 49p Rept no. MRC-TSR-2112
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041
Sponsored in part by Contract W-7405-eng-26.

A design optimality criterion tr(L) - optimality is applied to the problem of designing two-level multifactor experiments to detect the presence of interactions among the controlled variables. Rules are given for constructing tr(L) - optimal foldover designs and tr(L) - optimal fractional factorial designs. Some results are given on the power of these designs for testing the hypothesis that there are no two-factor interactions. Modifications of the tr(L) - optimal designs to satisfy other experimental objectives (estimability of effects, detection of the presence of other nonlinear effects, estimation of the error variance) are suggested. Examples are given to demonstrate the application of these designs to (i) screening for interactions, and (ii) evaluating the first-order assumption in the sensitivity analysis of a computer code.

AD-A093 574/2 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Elementary Proofs of an Inequality for Symmetric Functions for n < or = 5.
Technical summary rept.,
Roland Zielke. Aug 80, 18p Rept no. MRC-TSR-2113
Contract DAAG29-80-C-0041

Some aspects of the heat transfer in the emergency cooling of nuclear reactors lead to a nonlinear eigenvalue problem, the so-called model quelch front problem. Laquer and Wendroff suggested a procedure for computing bounds of the eigenvalue which depend - among other things - on the validity of a certain inequality for elementary symmetric functions. This inequality is of interest in itself and was recently proved by Efroymson, Swartz and Wendroff using a fairly complicated argument. We give an elementary proof for n < or = 5.

AD-A093 575/9 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Numerical Construction of Smooth Surfaces from Aggregated Data.
Technical summary rept.,
Nira Dyn, and Warren Ferguson. Oct 80, 24p Rept no. MRC-TSR-2129
Contract DAAG29-80-C-0041

The numerical construction of a smooth surface with prescribed weighted integrals over a domain of interest, is investigated. This construction is mostly relevant to the estimation of a smooth density function over geographical regions, from data aggregated over several subregions. By analogy to the definition of the univariate histospline the smooth surface is defined as the solution to a certain constrained minimization problem. The application of finite element methods to the numerical solution of the minimization problem is studied. It is shown that any finite element procedure, convergent for a related boundary value problem can be used to construct a sequence of finite element approximations converging to the smooth surface which solves the constrained minimization problem. For the case of smoothness requirement of lowest order, a specific finite element method is considered, and its convergence as the mesh size decreases is demonstrated numerically for a particular example of volume matching. (Author)

AD-A093 606/2 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Further Comparison of Deterministic and Stochastic Lanchester-Type Combat Models.
Master's thesis,
Kurt Dieter Klemm. Sep 80, 88p

This thesis examines the differences of deterministic and stochastic LANCHESTER-type combat models. Using an example of square-law attrition, solution methods and solutions are described. A new analytic solution for equal attrition rate coefficients is given. The numerical comparison includes hypotheses about the expected force levels and the variability in the expected force levels as a function of time, initial force levels, and breakpoint force levels. (Author)

AD-A093 607/0 PC **A05**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Continuity for Weak Solutions to Certain Singular Parabolic Equations.
Technical summary rept.,
Emmanuele Di Benedetto. Oct 80, 88p Rept no. MRC-TSR-2124
Contract DAAG29-80-C-0041, Grant NSF-MCS78-09525

It is demonstrated that weak solutions of (parabolic equations) in the introduction are continuous in their domain of definition. The continuity up to the boundary is also investigated.

AD-A093 608/8 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
An Updated Version of the Kantorovich Theorem for Newton's Method.
Technical summary rept.,
George Miel. Oct 80, 17p Rept no. MRC-TSR-2125
Contract DAAG29-80-C-0041

An affine invariant version of the Kantorovich theorem for Newton's method is presented. The result includes the Gragg-Tapia error bounds, as well as recent optimal and sharper upper bounds, new optimal and sharper lower bounds, and new inequalities showing q-quadratic convergence all in terms of the usual majorizing sequence. Closed form expressions for these bounds are given. (Author)

AD-A093 609/6 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Some Approximation Properties in Orlicz-Sobolev Spaces.
Technical summary rept.,

Jean-Pierre Gossez. Oct 80, 18p Rept no. MRC-TSR-2126
Contract DAAG29-80-C-0041

We prove that weak derivatives in general Orlicz spaces are globally strong derivatives with respect to the modular convergence. Other approximation theorems involving the modular convergence are presented, which improve known density results of interest in the existence theory for strongly nonlinear boundary value problems. (Author)

AD-A093 610/4 PC **A05**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
On Periodic Water-Waves and Their Convergence to Solitary Waves in the Long-Wave Limit.
Technical summary rept.,
C. J. Amick, and J. F. Toland. Oct 80, 77p Rept no. MRC-TSR-2127
Contract DAAG29-80-C-0041

A detailed discussion of Nekrasov's approach to the steady water-wave problems leads to a new integral equation formulation of the periodic problem. This development allows the adaptation of the methods of (1) to show the global convergence of periodic waves to solitary waves in the long-wave limit. In addition, it is shown how the classical integral equation formulation due to Nekrasove leads, via the Maximum Principle, to new results about qualitative features of periodic waves, for which there has long been a global existence theory (9, 12). (Author)

AD-A093 611/2 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Application of Interval Integration to the Solution of Integral Equations.
Technical summary rept.,
L. B. Rall. Oct 80, 21p Rept no. MRC-TSR-2128
Contract DAAG29-80-C-0041

A method of numerical solution is presented for a class of integral equations which includes linear and nonlinear equations encountered in applications. A brief sketch is given of methods from classical analysis (inversion of power series) and functional analysis (functional and monotone iteration), together with some of their shortcomings (difficulty of implementation, error estimation, and special conditions on operators and initial approximations). Interval functions, which may be considered to be sets consisting of all functions bounded above and below by given end-point functions, are defined, and the recently developed theory of interval integration is used to construct interval extensions of real integral operators. These interval operators are used to define an interval iteration process which converges if the initial interval contains a solution of the integral equation. Furthermore, the endpoint functions of the iterated interval functions provide upper and lower bounds for the solution at each stage of the iteration, and the interval iteration operator can be constructed so that the results of each transformation can be represented exactly. A numerical example is given of an interval iteration which gives a numerical solution of a nonlinear integral equation outside the limits of convergence of classical and function methods. Some problems connected with the use of interval iteration are also discussed. (Author)

AD-A093 612/0 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Hausdorff's Moment Problem and Expansions in Legendre Polynomials.
Technical summary rept.,
R. Askey, I. J. Schoenberg, and A. Sharma. Oct 80, 15p Rept no. MRC-TSR-2130
Contract DAAG29-80-C-0041

A new proof is given for Hausdorff's condition on a set of moments which determines when the function generating these moments is in L2. The proof uses Legendre polynomials and their discrete extensions found by Tchebychef. Then an extension is given to a weighted L2 space using Jacobi polynomials and their discrete extensions. (Author)

AD-A093 613/8 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Characterization of Normal Operators.
Technical summary rept.,
Shmuel Friedland, and Luc C. Tartar. Oct 80, 11p Rept no. MRC-TSR-2132
Contract DAAG29-80-C-0041

Let A be a bounded linear operator in a Hilbert space. If A is normal then log(absolute value of ((e to the At)u)) and log(absolute value of ((e to the A prime t)u)) are convex functions for all u not equal to 0. In this paper we prove that these properties characterize normal operators. (Author)

AD-A093 614/6 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
On the Initial Value Problem for a Nonlinear Schroedinger Equation.
Technical summary rept.,
Guang-Chang Dong, and Shujie Li. Oct 80, 19p Rept no. MRC-TSR-2133
Contract DAAG29-80-C-0041

In this paper we study conditions that ensure existence and uniqueness of solution to the initial value problem for the nonlinear Schrodinger equation. Many known results in the one dimensional space are extended to the higher dimensional cases. We also establish bounds and investigate decay properties for the solution. (Author)

AD-A093 615/3 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Asymptotic Behavior of Some Nonlinear Heat Equations.
Technical summary rept.,
P. L. Lions. Nov 80, 27p Rept no. MRC-TSR-2134
Contract DAAG29-80-C-0041

In this paper a semilinear heat equation with a convex nonlinearity is considered. The asymptotic bahavior of the solutions is completely determined and this gives, in particular, a very precise description of the global stability of stationary solutions. (Author)

AD-A093 616/1 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
The Connection between Partial Differential Equations Soluble by Inverse Scattering and Ordinary Differential Equations of Painleve Type.
Technical summary rept.,
J. B. McLeod, and P. J. Olver. Nov 80, 42p Rept no. MRC-TSR-2135
Contract DAAG29-80-C-0041

A completely integrable partial differential equation is one which has a Lax representation, or, more precisely, can be solved via a linear integral equation of Gel'fand-Levitan type, the classic example being the Korteweg-de Vries equation. An ordinary differential equation is of Painleve type if the only singularities of its solutions in the complex plane are poles. It is shown that, under certain restrictions, if G is an analytic, regular symmetry group of a completely integrable partial differential equation, then the reduced ordinary differential equation for the G-invariant solutions is necessarily of Painleve type. This gives a useful necessary condition for complete integrability, which is applied to investigate the integrability of certain generalizations of the Korteweg-de Vries equation, Klein-Gordon equations, some model nonlinear wave equations of Whitham and Benjamin, and the BBM equation. (Author)

AD-A093 622/9 PC **A09**/MF **A01**
Frank J. Seiler Research Lab., United States Air Force Academy, CO.
Optimal Periodic Control Theory.
Final rept.,
Richard T. Evans. Aug 80, 178p Rept no. FJSRL-TR-80-0024

Existing conditions for locally optimizing a periodic process with free period are corrected, extended, and clarified using the strong properties of the Hamiltonian structure of the Optimal Periodic Control (OPC) Problem and the relationships of the second variation that result from the problem's periodicity constraints. A neighboring optimum feedback controller is determined which regulates all perturbations back to the locally minimizing periodic trajectory. This periodic regulator extends many of the concepts of the time invariant regulator. An illustrative problem is constructed to demonstrate the basic characteristics of this class of problem. A relatively comprehensive numerical investigation is conducted identifying a multiplicity of extremal solutions which are shown to form one-parameter families of solutions to the OPC. Bifurcation points, which define the critical periodic solutions common to intersecting families, are computed. Extremal solutions, satisfying all first order conditions, are tested for local sufficiency conditions by verifying the existence of the Ricatti' variable over one full period. The neighboring optimal feedback control law for a locally minimizing solution is tested by demonstrating the limit cycle behavior that results from perturbations to the initial conditions in a closed loop application. An asymptotic series expansion is derived for the illustrative problem using a perturbation technique.

AD-A093 628/6 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
On Limits of Multivariate B-Splines.
Technical summary rept.,
Wolfgang Dahmen, and Charles A. Micchelli. Sep 80, 36p Rept no. MRC-TSR-2114
Contract DAAG29-80-C-0041

B-splines occupy a pivotal position in the theory of univariate spline functions. They offer a firm bases for many of the attractive theoretical and practical properties of splines. Therefore any advance in our knowledge concerning the multivariate B-spline should be of some value. The purpose of this paper is to investigate another aspects of multivariate B-splines. We succeed in identifying those distribution functions which are limits of multivariate B-splines (Polya distributions). This question was solved in one dimension by Curry and Schoenberg. Some properties of Polya distributions on Rs are also discussed.

AD-A093 629/4 PC **A04**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Clines Induced by Variable Selection and Migration.
Technical summary rept.,
P.C. Fife, and L. A. Peletier. Sep 80, 52p Rept no. MRC-TSR-2115
Contract DAAG29-80-C-0041, Grant NSF-MCS78-04443
Sponsored in part by Grant NSF-MCS78-02158.

The problem studied is in the area of differential equations; it models the spatial distribution of the genetic composition of a population in a heterogeneous environment, account being taken of migration and natural selection effects. More generally, it models a distribution in the composition of an ecological community. A number of conditions are given which guarantee the existence or nonexistence of a stable nonuniform equilibrium distribution, which is known as a cline. Of special interest is the case when two stable homogeneous distributions are possible; there may or may not also exist a heterogeneous one. (Author)

AD-A093 630/2 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Solution of Packed-Bed Heat-Exchanger Models by Orthogonal Collocation Using Piecewise Cubic Hermite Functions.
Technical summary rept.,
Anthony G. Dixon. Sep 80, 44p Rept no. MRC-TSR-2116
Contract DAAG29-80-C-0041, Grant NSF-ENG76-24368

Orthogonal collocation using piecewise cubic Hermite functions is used to solve the elliptic partial differential equations arising from pseudo-continuum models of heat transfer in a packed bed. Problems arising from a discontinuity in the wall boundary condition and from the semi-infinite domain of the differential operator are discussed. Comparison is made between the computed solution and experimental results. (Author)

AD-A093 631/0 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
The Behavior of Spherically Symmetric Equilibria Near Infinity.
Technical summary rept.,
C. Conley. Sep 80, 13p Rept no. MRC-TSR-2117
Contract DAAG29-80-C-0041

The study of the radially symmetric equilibria of a non-linear diffusion equation in several space dimensions leads to an ordinary differential equation. Under the hypotheses that the reaction terms are in gradient form, conditions are found which imply that solutions are asymptotically constant at infinity. As an application it is shown that the all spherically symmetric solutions of the sine-Gordon equation are asymptotically constant (and consequently bounded). (Author)

AD-A093 632/8 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
The Convergence of an Instrumental-Variable Like Recursion.
Technical summary rept.,
V. Solo. Sep 80, 16p Rept no. MRC-TSR-2118
Contract DAAG29-80-C-0041

For the prediction of signals in real time it is often necessary to estimate the parameters of a signal model in real time also. A large number of these so called recursive parameter estimation schemes have been suggested and the basic question for these schemes is whether or not they converge and whether they have to be monitored to ensure they do. This work deals with the convergence analysis of one (or only two known) particular recursion(s) that does not require monitoring. (Author)

AD-A093 633/6 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Smoothing Estimation of Stochastic Processes. Part I. Change of Initial Condition Formulae.
Technical summary rept.,
V. Solo. Sep 80, 35p Rept no. MRC-TSR-2119
Contract DAAG29-80-C-0041
See also Part 2, AD-A093 634.

Recently a great amount of attention has been focused on various algorithms for solving the smoothing problem of linear estimation theory. This work is the first part of a two part investigation of these algorithms. In Part I it is shown how change of initial condition (CIC) or partitioning formulae hold in a very general setting (the CIC problem is shown to involve fixed rank perturbation in matrix inversion). In Part II the nature of the two-filter algorithms is explored by providing a simple derivation that shows to what extent the formulae hold generally and so reveals exactly how a wide sense Markovian assumption is necessary for their full utility. The remainder of the paper is structured as follows. Section I contains a discussion of CIC formulae for discrete observations. Section II concerns CIC formulae for continuous observations (actually the formulae are the same). Section III discusses the relation with other work.

AD-A093 634/4 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Smoothing Estimation of Stochastic Processes. Part II. Two Filter Formulae.
Techanical summary rept.,
V. Solo. Sep 80, 25p Rept no. MRC-TSR-2120
Contract DAAG29-80-C-0041
See also Part 1, AD-A093 633.

In this article these two-filter results and some new ones are derived in a simple way in a very general setting (for arbitrary nonstationary processes). It turns out however that only if a wide-sense (i.e. second order) Markovian assumption is added can one of the filters be viewed as a backwards filter. The remainder of the paper is organized as follows. Section 2 recalls some smoothing formulae that apply to both continuous and discrete observations. Section 3 discusses two types of two-filter-like formulae for general nonstationary processes. In Section 4 one of the filters is shown to be a backwards least squares estimate provided a wide sense Markovian assumption is satisfied. Section 5 contains a derivation of some backwards filters. In Section 6 some additional two-filter-like formulae are given. The final section is a conlusion.

AD-A093 635/1 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Solutions of Asymptotically Linear Operator Equations via Morse Theory.
Technical summary rept.,
Kung-Ching Chang. Sep 80, 26p Rept no. MRC-TSR-2121
Contract DAAG29-80-C-0041

In this paper, we use the classical Morse theory of critical points to study the existence and multiplicity of solutions of a class of asymptotically linear operator equations. As special cases, we include multiplicity results for semilinear elliptic BVP's, as well as existence and multiplicity of periodic solutions of semilinear wave equation and of Hamiltonian systems. These results simplify and complement recent work of Amann Zehnder and Castro Lazer. (Author)

AD-A093 636/9 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Optimal Upper Confidence Limits for Products of Poisson Parameters with Applications to the interval Estimation of the Failure Probability of Parallel Systems.
Technical summary rept.,
Bernard Harris, and Andrew P. Soms. Sep 80, 28p Rept no. MRC-TSR-2122
Contracts DAAG29-80-C-0041, N00014-79-C-0321

The problem of obtaining optimal upper confidence limits for systems of independent parallel components is treated. Exact optimal upper confidence limits are obtained for an arbitrary number of components for specified failure combinations. For a small number of failures, bounds on the upper confidence limits are obtained. For an arbitrary number of failures an approximation is given which is justified numerically and asymptotically. The results of this paper are compared with the results given by Buehler (1957) and some numerical examples are presented. (Author)

AD-A093 637/7 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Note on a Difficulty Inherent in Estimating Reliability from Stress-Strength Relationships.
Technical summary rept.,
Bernard Harris, and Andrew P. Soms. Oct 80, 12p Rept no. MRC-TSR-2123
Contracts DAAG29-80-C-0041, N00014-79-C-0321

This note calls attention to a difficulty which arises frequently in the application of stress-strength methods in reliability theory. This difficulty has led to unanticipated catastrophic failures in a number of applications. (Author)

AD-A093 640/1 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Physics and Astronomy.
Computer-Aided Closure of the Lie Algebra Associated with a Nonlinear PDE,
Allan Reiman. Oct 80, 21p Rept nos. PUB-81-092, PL-81-020
Contract DE-AC05-79ET-53044

Since the solution of the KdV equation by Gardner, Greene, Kruskal and Miura in 1967, the inverse scattering method which they discovered has been extended to solve a large class of nonlinear PDE's. However, a method for seeking an inverse scattering solution to a given equation has emerged from the work of Wahlquist and Estabrook. The Wahlquist-Estabrook (WE) method systematically associates a set of Lie brackets with a given nonlinear PDE. If this Lie algebra can be closed, consistent with the Jacobi identity, then an associated linear representation gives the inverse scattering transform, when one exists. Even when an inverse scattering transform does not exist, if the Lie algebra can be closed the associated linear representation can provide useful information about the solutions of the nonlinear PDE. This task involves repeated application of the Jacobi identities, which in turn requires the evaluation of a large number of Lie brackets which must be looked up in a table. The simple but repetitive nature of this task suggests that we attempt to mechanize it using a computer. However, we must also require that our program automatically perform algebraic simplifications at each step: properly distributing the Lie bracket over a sum of terms, combining like terms, multiplying numerical coefficients, etc. We have therefore used the symbolic manipulation language MACSYMA to implement our algorithms. The language has built-in capabilities for performing the standard simple algebraic manipulations from which we build up our algorithms.

AD-A093 710/2 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Statistics.
Selecting All Treatments Better Than a Control Using Existing Tables.
Technical rept.,
Roger L. Berger. Oct 80, 17p FSU-STATISTICS-M660, D-49-ARO, ARO-16713.13-M
Contract DAAG29-79-C-0158

In this paper subset selection procedures for selecting all treatment populations with means larger than a control population are proposed. The treatments and control are assumed to have a multivariate normal distribution. Various covariance structures are considered. All of the proposed procedures are easily implemented using existing tables of the multivariate normal and multivariate t distributions. Some other procedures which have been proposed require extensive and unavailable tables for their implementation. (Author)

AD-A093 787/0 PC **A03**/MF **A01**
California Univ., Berkeley. Operations Research Center.
Approaches to Inverse Linear Regression. Revision.
Research rept.,
R. Avenhaus, E. Hoepfinger, and W. S. Jewell. Oct 80, 34p Rept no. ORC-80-21
Grant AFOSR-77-3179
Revision of report dated Jun 76, AD-A034 865.

Many measurement problems can be formulated as follows: First, a certain linear relationship between two variables is to be estimated by using pairs of input and output data; thereafter, the value of an unknown input variable is to be estimated given an observation of the corresponding output variable. This problem is often referred to as inverse regression or discrimination. In this paper first non-Bayesian approaches to the problem, thereafter the Bayesian approach by Hoadley are presented. Third, a Bayesian approach by Avenhaus and Jewell is discussed which uses the ideas of credibility theory. Finally, a new Bayesian approach is presented. The advantages and disadvantages of the various approaches are put together. (Author)

AD-A093 816/7 PC **A02**/MF **A01**
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
Concordant and Discordant Monotone Correlations and Their Evaluation by Nonlinear Optimization.
Interim rept.,
George Kimeldorf, Jerrold H. May, and Allan R. Sampson. Oct 80, 21p TR-80-20, AFOSR-TR-80-1344
Contract F49620-79-C-0161, Grant NSF-MCS80-02152
Prepared in cooperation with Texas Univ. at Dallas.
Availability: Microfiche copies only.

This paper presents four new statistical measures of monotone relationship derived from the concept of monotone correlation. A nonlinear optimization algorithm is employed to evaluate these new measures, as well as the monotone correlation, for ordinal contingency tables. A computer program to implement the algorithm is developed, and is applied to several insightful examples to provide further understanding of the usefulness of these measures. (Author)

AD-A093 824/1 PC **A03**/MF **A01**
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
Some Comments on the Minimum mean Square Error as a Criterion of Estimation.
Interim rept.,
C. Radhakrishna Rao. Oct 80, 41p TR-80-21, AFOSR-TR-80-1343
Contract F49620-79-C-0161

It is shown that estimators obtained by MMSE (minimizing the mean square error) may not have optimum properties with respect to other criteria such as PN (probability of nearness to the true value in the sense of Pitman) or PC (probability of concentration around the true value). In particular, a detailed study is made of estimators obtained by shrinking the minimum variance unbiased estimators to reduce the MSE. It is suggested that because of mathematical convenience and some intuitive considerations, MMSE could be used as a primitive postulate to derive estimators, but their acceptability should be judged on more intrinsic criteria such as PN and PC. (Author)

AD-A093 828/2 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
A Square Root of a Matrix Approach to Obtain the Solution to a Steady Matrix Riccati Equation.
Daniel W. Repperger. 28 Mar 76, 3p Rept no. AFAMRL-TR-76-5
Pub. in IEEE Transactions on Automatic Control, p786-787 Oct 76.

No abstract available.

AD-A093 844/9 PC **A03**/MF **A01**
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
Asymptotic Joint Distribution of Functions of the Elements of Sample Covariance Matrix.
Interim rept.,
C. Fang, and P. R. Krishnaiah. Oct 80, 28p TR-80-22, AFOSR-TR-80-1345
Contract F49620-79-C-0161
Prepared in cooperation with Carnegie-Mellon Univ., Pittsburgh, PA.

In this paper, the authors give asymptotic expressions for the joint distribution of the functions of the elements of the sample covariance matrix and sample correlation matrix in the noncentral cases when the underlying distribution is multivariate normal. Accuracy of the above expressions is also studied. Also, asymptotic expressions are given for functioning of the elements of the sample covariance matrix for nonnormal populations. Finally, some application of the above results are discussed. (author)

AD-A093 861/3 Not available NTIS
Maryland Univ., College Park.
Whittaker Functions with Both Parameters Large: Uniform Approximations in Terms of Parabolic Cylinder Functions,
F. W. J. Olver. 28 May 79, 23p ARO-14044.4-M
Grants DAAG29-77-G-0003, NSF-MCS78-02111
Availability: Pub. in Proceedings of the Royal Society of Edinburgh, v86A p213-234 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 875/3 PC **A03**/MF **A01**
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
Entropy Differential Metric, Distance and Divergence Measures in Probability Spaces - A Unified Approach.
Interim rept.,
J. Burbea, and C. Radhakrishna Rao. Oct 80, 39p TR-80-18, AFOSR-TR-80-1374
Contract F49620-79-C-0161

The paper is devoted to metrization of probability spaces through the introduction of a quadratic differential metric in the parameter space of the probability distributions. For this purpose, a thi-entropy functional is defined on the probability space and its Hessian along a direction of the tangent space of the parameter space is taken as the metric. The distance between two probability distributions is computed as the geodesic distance induced by the metric. The paper also deals with three measures of divergence between probability distributions and their inter-relationships. (Author)

AD-A093 876/1 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Mathematics.
Goal and Average Cost Problems in Decision Processes with Finite State Spaces.
Final rept.,
Theodore P. Hill. 1980, 4p AFOSR-TR-80-1342
Contract F49620-79-C-0123

The principal investigator carried out research in probability theory, and, in particular, in the theory of decision processes. First, it was shown that in every finite state decision process (gambling problem) with single fixed goal, there always exists a stationary strategy which not only (nearly) maximizes the probability of reaching the goal, but (nearly) minimizes the expected time to the goal. This result was considerably generalized to include decision processes with arbitrary state spaces and total cost criteria. Investigations of these processes led to results in optimal stopping theory, and in classical probability theory. Universal, best possible constants were found which compared the optimal expected return of a decision maker with the expected supremum of a sequence of independent random variables. A generalization of the classical Borel-Cantelli Lemma was found, as was a very general conditioning principle for strong laws of several forms. The question of existence of good Markov strategies in finite state decision processes with average reward criteria was addressed, and various partial results were obtained, although the general case was not settled. (Author)

AD-A093 895/1 PC **A02**/MF **A01**
California Univ., Santa Barbara. Inst. for Algebra and Combinatorics.
Some Variations on the Numerical Range.
Interim rept.,
Marvin Marcus, and Bo-Ying Wang. 7 Mar 80, 12p AFOSR-TR-80-1372
Contract F49620-78-C-0030
Pub. in Linear and Multilinear Algebra, v9 p111-120 1980.

No abstract available.

AD-A093 896/9 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta.
On the Computational Solution of Elliptic and Parabolic Free Boundary Problems,
Gunter H. Meyer. 1980, 24p ARO-13874.8-M
Grant DAAG29-76-G-0261
Availability: Pub. in Proceedings of a Seminar Free Boundry Problem, v1 p151-173 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 906/2 Not available NTIS
Missouri Univ.-Columbia.
Some Sturm Theory,
Walter Leighton. 6 Aug 79, 9p ARO-13610.5-M
Grant DAAG29-76-G-0206
Availability: Pub. in Jnl. d'Analyse Mathematique, v36 p191-197 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 910/8 Not available NTIS
Delaware Univ., Newark.
On Hopf Type Maximum Principles for Convex Domains,
L. E. Payne, Rene Sperb, and Ivar Stakgold. 25 Oct 76, 15p ARO-13466.1-M
Grant DAAG29-76-G-0102
Prepared in cooperation with Cornell Univ., Ithaca, NY.
Availability: Pub. in Nonlinear Analysis, Theory, Methods and Applications, v1 n5 p547-559 1977 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 914/0 PC **A02**/MF **A01**
California Univ., Santa Barbara. Inst. for Algebra and Combinatorics.
Rearrangement Inequalities,
Henryk Minc. 29 Oct 79, 8p AFOSR-TR-80-1373
Contract F49620-78-C-0030
Pub. in Proceedings of the Royal Society of Edinburgh, v86A p339-345 1980.

No abstract available.

AD-A093 969/4 PC **A03**/MF **A01**
Army Aviation Research and Development Command, St Louis, MO.
Probabilistic Estimates with Limited Data.
Final rept.,
Conrad W. Faber. Nov 80, 43p Rept no. USAAVRADCOM-TM-81-F-1

Decision makers require and need more than a point estimate of the cost and schedule for new or on-going programs. Much has been written about how to quantify program risks based upon historical data. However, estimates for new systems frequently depend upon expert opinion from a few knowledgeable persons because an applicable historical data base is not available. The method proposed in this report utilizes a PERT type network, beta distribution parameters for expert opinion inputs, and convolution of activity distributions by simulation. (Author)

AD-A093 983/5 PC **A12**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Nonlinear Evolution Equations,
Michael G. Crandall. 1978, 260p Rept no. MRC-PUB-40
Contract DAAG29-75-C-0024, Grant N00014-77-G-0063
Sponsored in part by Grant NSF-MCS77-07583.
Availability: Academic Press, 111 Fifth Avenue, New York, NY. 10003 HC$13.00 (No copies furnished by DTIC).

This volume constitutes the proceedings of the Symposium on Nonlinear Evolution Equations held in Madison, October 17-19, 1977. The thirteen papers presented here follow the order of the corresponding lectures. J. Moser's lecture, 'Differential Equations Connected with Iso-Spectral Deformations,' is not represented in this volume. However, the relevant material is forthcoming in a joint article by J. Moser and M. Adler in Comm. Math. Phys. (1978). This symposium was sponsored by the Army Research Office, the National Science Foundation, and the Office of Naval Research. Among those who contributed to the success of the symposium John A. Nohel, our cochairman, deserves special mention. Hearty thanks are also due to the speakers, the chairmen of the sessions, our peerless symposium secretary Mrs. Gladys G. Moran, and the outstanding group of participants who made the symposium such an exceptional event. The cheerful competence of Judith Siesen was indispensable in preparing this volume. (Author)

N81-15741/4 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Nonstandard Aspects of a Time-Discrete Boltzmann Equation.
L. Arkeryd. 1980, 11p CTH-MATH-1980-8

The existence of solutions and subsolutions of a time-discrete, space-inhomogeneous Boltzmann equation with unbounded kernel was proved. The convergence of the subsolutions to subsolutions of the time-continuous (usual) Boltzmann equation was also proved. The proofs were based on Loeb-space techniques.

N81-15744/8 PC **A03**/MF **A01**
Mathematisch Centrum, Amsterdam (Netherlands).
Algebraically Specified Programming Systems and Hoare's Logic.
J. A. Bergstra, and J. V. Tucker. Sep 80, 29p MC-IW-143/80
Submitted for Publication.

A special set of program constructs for computing on data types defined by algebraic specifications using initial algebra semantics is described. An algebraically styled logic is provided for proving algebraic statements about the partial correctness of programs in the resulting programming language. It is shown that given any computable data type A and any algebraically asserted program (p)S(q)

which is provable in a Hoare logic using computable intermediate assertions then there exists an algebraic specification, involving at most six hidden functions and four equations, which defines A and allows (p)S(q) to be provable in the algebraic Hoare logic uding intermediate assertions formally provable from the axioms of the specifications.

N81-15751/3 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
On the Structure of Stationary Flat Processes, Part 3.
O. Kallenberg. 1980, 23p CTH-MATH-1980-2-PT-3

For arbitrary k and d with 1 k d, sufficient conditions in terms of the second order moment measure are found for a stationary random measure in the space of k flats in R(d) to be a.s. invariant. Some of these conditions are further shown to be almost sharp, in the sense of being nearly fulfilled for a certain class of stationary random measures which fail to be invariant. The latter results are based on estimates of the distributions under the homogeneous probability measure of certain rotational invariants for pairs of linear subspaces.

N81-15752/1 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
A Nonstandard Approach to the Boltzmann Equation.
L. Arkeryd. 1980, 11p CTH-MATH-1980-7

The space-inhomogeneous, nonlinear Boltzmann equation with a quite general collision operator and L(1) initial data is investigated. The main result is the existence of Loeb-L(1) subsolutions. Whenever the subsolutions are true solutions they are t continuous in the classical sense. The proofs rely on the observation that monotone entropy and finite energy imply Loeb integrability of nonstandard solutions, in the case of a truncated equation. In the space homogeneous case, classical solutions are obtained with the method.

PB81-858094 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Discrete Fourier Analysis Theory and Applications. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 54p

This retrospective bibliography contains citations concerning theory relating to techniques and applications for Discrete Fourier Analysis. Consideration is given to computations, effectiveness, and properties of Discrete Fourier Analysis as well as methods for generation of Discrete Fourier Transform pairs and relationships between Discrete Fourier Transforms and Fast Fourier Transforms. Applications range from frequency or spectrum analysis and solving linear equations to computing multidimensional convolutions. (Contains 54 citations, fully indexed and including a table of contents.)

PB81-858102 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Discrete Fourier Analysis Theory and Applications. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 162p

This retrospective bibliography contains citations concerning theory relating to techniques and applications for Discrete Fourier Analysis. Consideration is given to computations, effectiveness, and properties of Discrete Fourier Analysis as well as methods for generation of Discrete Fourier Transform pairs and relationships between Discrete Fourier Transforms and Fast Fourier Transforms. Applications range from frequency or spectrum analysis and solving linear equations to computing multidimensional convolutions. (Contains 157 citations, fully indexed and including a table of contents.)

PB81-858227 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Walsh Functions. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 120p

This retrospective bibliography contains citations concerning the theory and applications of Walsh Functions to the evaluation, transformation, and solution of equations of functions; to the analysis to networks and circuits; and to information theory, data transmission and processing, function generation and frequency synthesis; signal processing, and multiplexing. The use of Walsh Functions in conjunction with computers and communication is most prevalent. (Contains 150 citations, fully indexed and including a table of contents.)

PB81-858359 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Sparse Matrices. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 99p

This retrospective bibliography contains citations concerning sparse matrix theory and techniques, and applications of them to the solution of equations and to numerical analysis and numerical proceedurces for a wide vanity of disciplines and problems. Consideration is also given to the nature of sparse matrices and to computerized sparse matrix simulation techniques. (Contains 109 citations, fully indexed and including a table of contents.)

UCRL-84644 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Monotone Piecewise Cubic Interpolation: Algorithms and Software.
F. N. Fritsch, and R. E. Carlson. Nov 80, 35p
CONF-801166-1
Contract W-7405-ENG-48
SIAM fall meeting, Houston, TX, USA, 6 Nov 1980.

An idea due to J. Butland (Computer Graphics 80, Online Public., Ltd., 1980, 409-422) leads to an improved algorithm for piecewise monotonic piecewise cubic interpolation. The modifications to the algorithm published (Siam J. Numer. Anal. 17, 2 (April 1980), 238-246) and plans for software implementing the new algorithm are described. 4 figures. (ERA citation 06:006810)

12B. Operations Research

AD-A093 571/8 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
On Yakhno's Model for a Leading Center.
Technical summary rept.,
Paul C. Fife. Aug 80, 26p Rept no. MRC-TSR-2110
Contract DAAG29-80-C-0041, Grant NSF-MCS79-04443

A reaction-diffusion model suggested by Yakhno as a model for the centers of periodic activity often seen in excitable media such as cardiac tissue and special chemical reagents is subjected to multiple-scale analysis. A fairly complete description of the process (which involves the generation of wave fronts) is obtained, but it is shown to be structurally unstable as it depends on symmetries in the basic equations. The allowed amount of deviation from symmetry is estimated. (Author)

AD-A093 617/9 PC **A03**/MF **A01**
Stanford Univ., CA. Systems Optimization Lab.
A Numerical Investigation of Ellipsoid Algorithms for Large-Scale Linear Programming.
Technical rept.,
Philip E. Gill, Walter Murray, Michael A. Saunders, and Margaret H. Wright. Oct 80, 27p Rept no. SOL-80-27
Contracts DAAG29-79-C-0110, N00014-75-C-0267
Sponsored in part by Contracts DE-AC03-76SF00326, DE-AT03-76ER72018 and Grants NSF-MCS79-26009, NSF-ENG77-06761.

The ellipsoid algorithm associated with Shor, Khachiyan and others has certain theoretical properties that suggest its use as a linear programming algorithm. Some of the practical difficulties are investigated here. A variant of the ellipsoid update is first developed, to take advantage of the range constraints that often occur in linear programs (i.e., constraints of the form $l < or = aTx < or = u$, where u - l is reasonably small). Methods for storing the ellipsoid matrix are then discussed for both dense and sparse problems. In the large-scale case, a major difficulty is that the desired ellipsoid cannot be represented compactly throughout an arbitrary number of iterations. Some schemes are suggested for economizing on storage, but any guarantee of convergence is effectively lost. At this stage there remains little room for optimism that an ellipsoid-based algorithm could complete with the simplex method on problems with a large number of variables. (Author)

AD-A093 618/7 PC **A03**/MF **A01**
Stanford Univ., CA. Systems Optimization Lab.
Worst Case Analysis of Greedy Heuristics for Integer Programming with Non-Negative Data.
Technical rept.,
Greg Dobson. Oct 80, 27p Rept no. SOL-80-25
Contracts N00014-75-C-0267, DE-AC03-76SF00326
Prepared in cooperation with Contract DE-AT03-76ER72018 and Grants NSF-MCS76-81259, NSF-MCS79-26009 and NSF-ENG77-06761.

We give a worst case analysis for two greedy heuristics for the integer programming problem minimize cx, $Ax > or = b$, $O < or = x < or = u$, x integer, where the entries A, b, and c are all nonnegative. The first heuristic is for the case where the entries in A and b are integral, the second only assumes the rows are scaled so that the smallest nonzero entry is at least 1. In both cases we compare the ratio of the value of the greedy solution to that of the integer optimal. The error bound grows logarithmically in the maximum column sum of A for both heuristics. (Author)

AD-A093 679/9 PC **A06**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
A Tutorial on Markov Renewal Theory Semi-Regenerative Processes and Their Applications.
Technical rept.,
Ralph L. Disney. Dec 80, 109p Rept no. VTR-80-07
Contract N00014-77-C-0743, Grant NSF-ENG77-22757

This is a tutorial paper on Markov renewal processes, semi-regenerative processes and their applications to many fields of interest. It was presented in the tutorial sessions of the O.R.S.A./T.I.M.S. meetings in Colorado Springs, November, 1980. The paper reviews the basic ingredients of the processes discussed, such as: structure of the process, semi-Markov kernels, Markov renewal functions, and integral equations of semi-regenerative processes. Considerable time is spent discussing several applications to combat line-of-sight, queueing, policy medical emergency systems, disease modelling, power generator reliability and worker fatigue. The bibliography of 21 items provides further readings for the beginner to pursue these topics. (Author)

AD-A093 707/8 PC **A06**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
A Simulation Analysis of Sojourn Times in a Jackson Network.
Technical rept.,
Peter C. Kiessler. Dec 80, 124p Rept no. VTR-80-16
Contract N00014-77-C-0743, Grant NSF-ENG77-22757

This thesis analyzes the total sojourn time distribution of a three queue acyclic Jackson network with

the following characteristics. The network consists of three single server queues, Q1,Q2, and Q3, each having exponential service times. There is a Poisson exogenous arrival process to Q1. Customers departing Q1 go immediately to Q2, w.p. p, or to Q3, w.p. 1-p. Customers departing Q2 go immediately to Q3 and those departing Q3 leave the network. For different parameter settings, the network is simulated and the sojourn times at each of the queues are recorded. Due to the structure of the network, a simple simulation which correctly models the network can be constructed. It is known from Simon and Foley (1979), that the sojourn times of a customer in Q1 and Q3 are dependent. It is shown, that, except for extremely large sample sizes, 5000, that the correlation between the sojourn times in Q1 and Q3 is not significant. However, in the case of 5000 observations, this correlation is shown to be significantly greater than zero for certain parameter settings. Finally, the sample total sojourn time distribution is compared to one assuming independence of the sojourn times at each of the queues. It is shown that the sample distribution and the total sojourn time distribution assuming independence are not significantly different, except for p=O. (Author)

AD-A093 786/2 PC **A03**/MF **A01**
California Univ., Berkeley. Operations Research Center.
Substitutes and Complements in Network Flow Problems.
Research rept.,
David Gale, and Themistocles Politof. Oct 80, 28p Rept no. ORC-80-23
Contract M00014-76-C-0134, Grant NSF-SES78-05196

If f is a function of several variables, one calls a pair of variables substitutes (complements) if the change of the value of the function when both variables are increased is at most (at least) equal to the sum of the changes when each is increased separately. We here consider the case where f is the value of a maximum weight circulation on a network and the variables are the upper and lower bounds and the weights of a pair of arcs. We introduce a simple combinatorial criterion for two arcs to be in 'series' or 'parallel' and show that these two cases correspond to the variables being complements or substitutes respectively. This generalizes results of Shapley for the special case of the maximum flow and optimal assignment problems. We also show that our result is best possible in that if two arcs are neither in series nor parallel, then the corresponding variables can be either substitutes or complements or both. (Author)

AD-A093 855/5 Not available NTIS
Virginia Polytechnic Inst. and State Univ., Blacksburg.
The M/G/1 Queue with Instantaneous Bernoulli Feedback,
Ralph L. Disney, Donald C. McNickle, and Burton Simon. 1980, 11p
Contracts N00014-75-C-0492, N00014-77-C-0743
Supersedes Rept. no. VTR-79-22 dated Dec 79, AD-A081 256.
Availability: Pub. in Naval Research Logistics Quarterly, v27 n4 p635-644 Dec 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 866/2 PC **A12**/MF **A01**
University of Southern California, Los Angeles. Dept. of Industrial and Systems Engineering.
The One-On-One Stochastic Duel. Part III.
Final technical rept.,
C. J. Ancker, Jr. 15 Nov 80, 266p ISE-TR-80-1, ARO-15084.3-M
Contract DAAG29-78-C-0012
See also Parts 1 and 2, AD-A068 008.

This report is the second and final half of a project to exhaustively review the literature of one-on-one stochastic duels. This part contains a comprehensive compendium of all results contained in papers which were previously listed in the annotated bibliography of the preceding report. The results are given in a common notation and are systematically organized. (Author)

AD-A093 963/7 PC **A02**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Management Sciences Research Group.
Valid Inequalities for 0-1 Programming Polytopes.
Management sciences research rept.,
Egon Balas, and Joseph B. Mazzola. Nov 80, 24p Rept no. MSRR-468
Contract N00014-75-C-0621, Grant NSF-ECS79-02506

We introduce a family of valid inequalities for 0-1 programming polytopes that are typically not implied by individual problem constraints or by proper subsets of the full constraint set. The computational effort involved in generating such an inequality is linear in the number of variables and in the number of constraints. Several procedures are known in the literature for generating valid inequalities for, or facets of, knapsack polytopes, i.e., 0-1 programming polytopes with a single constraint. Although these inequalities are usually stronger than the corresponding Gomory cuts, since they make use of the binary nature of the variables, their strength is still limited by the fact that they are derived from single constraints. The inequalities introduced here can be viewed as generalizations to the multiconstraint case of the inequalities derived for the knapsack polytope.

AD-846 676/5 PC **A02**/MF **A01**
Aerospace Corp., San Bernardino, CA. San Bernardino Operations.
Rapid Near-Optimal Solution of Large Minimal Cyclic Routing Problems.
Technical rept. Jan-May 67 and May-Sep 68,
Leendert DeWitte. 20 Jan 69, 25p TR-0200(S4935-20)-1, SAMSO-TR-68-485
Contract F04701-68-C-0200
Distribution limitation now removed.

The solution to the problem of finding the minimal cyclic route through N points is approached by starting with a minimal route through a small number n of the points. A theorem is introduced which strongly limits the choices when trying to derive the minimal cyclic route when an additional point is added to an existing minimal route. Using this theorem, a basic algorithm has been constructed in which the number of operations are proportional to N cubed. The basic algorithm gives the correct optimal solution for the Fulkerson 48 city problem in a few seconds of CDC-6600 time, but, in general, solutions are not necessarily optimal. For very large problems (i.e., hundreds of points), refinements are introduced in the form of the best composite of a number of near-optimal approximate solutions. (Author)

N81-15738/0 PC **A02**/MF **A01**
Mathematisch Centrum, Amsterdam (Netherlands).
Algorithms for the State Probabilities and Waiting Times in Single Server Queueing Systems with Random and Quasi-Random Input and Phase-Type Service Times.
H. C. Tijms, and M. H. Vanhoorn. Mar 80, 20p MC-BW-120/80
Submitted for Publication.

A unifying algorithmic analysis is presented for a general class of single server queueing systems with a state dependent Markovian input process and a phase type service time distribution including single server queues with random and quasirandom input. Using regenerative analysis, numerically stable and efficient recursion schemes are developed to compute the state probabilities. The computation of the waiting times is based on the state probabilities.

N81-15755/4 PC **A02**/MF **A01**
Mathematisch Centrum, Amsterdam (Netherlands).
The Stochastic Filtering Problem for Point Processes.
J. H. Vanschuppen. Mar 80, 25p MC-BW-119/80
Submitted for Publication. Presented at Meeting on New Trends in Filtering and Identification of Stochastic Systems, Rotterdam, 23 Jan. 1980.

A brief exposition of the stochastic filtering problem in the case of point process observations is given. Some examples of these problems are presented. The modelling of point processes is discussed and the associated stochastic dynamical systems are formulated. Two methods to resolve the stochastic filtering problem are given, namely the semimartingale representation method and the measure transformation method. The stochastic filtering problem is given for several examples.

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

CONF-801210-11 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Some Heat Pump Concepts for Residual Heat Utilization.
H. Perez-Blanco, and F. C. Chen. 1980, 4p
Contract W-7405-ENG-26
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 15 Dec 1980.

Large quantities of low temperature heat in the industrial sector are rejected in the cooling water, condensate, and process water streams. While the energy rejected in these streams at temperatures between 40 and 80 exp 0 C amounts to 2.95 x 10 exp 9 GJ/y, 2.42 x 10 exp 9 GJ/y of process energy in the form of hot water and steam are needed in the United States. Industrial heat pumps, that recover the low temperature heat energy and upgrade it to a more usable temperature level, may improve the energy supply and demand situation. Two heat activated heat pump concepts - an absorption cycle system and an open cycle system are analyzed from the conceptual systems design and energy savings point of view. The results of the analysis and further research needs are presented. (ERA citation 06:006203)

COO-4490-8 PC **A02**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Use of Fluidized Bed Heat Exchangers in Heat Pump Systems for Improved Performance. Technical Status Report, March 1, 1979-August 31, 1979.
J. C. Chen, and R. G. Sarubbi. 31 Aug 79, 12p
Contract AC02-77ET11297

Final tests of the York Heat Pump performance have been conducted and yield COP values substantially in agreement with the manufacturers published data. Design of the finned tubing for the fluidized bed heat exchanger has been completed and vendors are being sought for fabrication. The net heat transfer area of the fins and tubes is about one-third that of the York evaporator and the heat duty one-third greater. Separate de-icing experiments with short u-tubes have proved inconclusive and design modifications of the test apparatus has begun. (ERA citation 06:006187)

COO-4490-9 PC **A02**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Use of Fluidized Bed Heat Exchangers in Heat Pump Systems for Improved Performance. Technical Status Report, September 1, 1979-February 29, 1980.
J. C. Chen, and R. G. Sarubbi. 25 Mar 80, 12p
Contract AC02-77ET11297

Modifications in the system were made to include backup pressure readings and to provide for refrigerant switching to the fluidized bed. Assembly of the finned tubing was completed and the air distributor system for the fluidized bed was designed and constructed. Tests without particles show the system to give uniform air flow over the entire bed surface. 40-60 sand was found to have a predominance of particles at 300 micron diameter which is comparable to GT-2 particles and is to be used as the bed material. Deicing experiments show that for subfreezing conditions fluidized beds will remove ice and also prevent ice formation. (ERA citation 06:006188)

DOE/CS/34153-3 PC **A02**/MF **A01**
Living Systems, Winters, CA.
Cool Pool Development. Quarterly Technical Report No. 3, July 1-September 30, 1980.
D. Batts. Sep 80, 16p
Contract FG04-77CS34153

The Cool Pool is a shaded evaporating pool that is connected to thermal mass storage in a thermosyphon configuration. The system requires no moveable insulation. The pool is placed outside a building, and the thermal mass, vertical tubes full of water, are inside the living space. The pool must be elevated so that its water level is as high or higher than the water level in the tubes for thermosyphoning to work properly. The pool is shaded to prevent heating by direct solar radiation. A schematic of the Cool Pool is shown and how it works is described. Tests performed at Living Systems at Winters, California and analytical results are discussed. (ERA citation 06:006190)

DOE/CS/60467-01 PC **A02**/MF **A01**
Massachusetts Building Code Commission, Boston.
Do it Yourself Lighting Power Survey: Lighting Power Audit for Use with the Massachusetts Type Watts Per Square Foot Method of Calculating a Building's Lighting Power Budget.
Jun 80, 11p
Contract FG01-79CS60467

Advantages of the self-audit approach to energy conservation are presented. These are that it is cheaper to do it yourself; the employees become part of the corporate conservation effect; and no one knows the building and its needs better than the occupant. Steps described in the lighting survey procedure are: (1) divide the building into categories; (2) determine the total square footage for each category; (3) assign a power allowance for each category; (4) multiply the total square footage for each category by the respective power allowances; (5) add the budget sub-totals for each category to determine total building budget; and (6) walk through the building room-by-room and calculate the connected lighting load fixture-by-fixture. Some worksheets are provided. (ERA citation 06:002448)

DOE/ET/13152-4 PC **A02**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Chemical Engineering.
Measuring and Modeling Solids Movement in a Large, Cold Fluidized Bed Test Facility. Fourth Quarterly Report, July 1, 1980-September 30, 1980.
T. J. Fitzgerald, R. V. Mrazek, and S. D. Crane.
Sep 80, 18p
Contract AC01-79ET13152

The principle of operation of the magnetic-particle, mass-flow measuring device was described in the first quarterly report. In addition, the results of a few preliminary tests which were carried out to show the feasibility of using this device were described in the third quarterly report. It was noted that the output signal from the device is proportional to velocity and that saturation of the material in the vicinity of the read coil had not yet been achieved. Thus, efforts during this quarter were concentrated upon two objectives - achieving saturation of the magnetic material in the vicinity of the road coil and establishing calibration procedures to be used with the device installed in a fluidized bed. (ERA citation 06:006354)

EPRI-CS-1585 PC **A03**/MF **A01**
Reluxtrol, South San Francisco, CA.
Assessment of Current NDI Techniques for Determining the Type, Location, and Extent of Fossil-Fired Boiler Tube Damage. Final Report.
E. R. Reinhart, D. Johnson, and S. Sarian. Oct 80, 30p

Assessment of state-of-the-art nondestructive evaluation techniques for detecting the type, location, and extent of fossil-fired boiler tube damage was made through on-site visits and canvassing by questionnaire. The results of this survey indicate that state-of-the-art for fossil fired boiler tube NDE practice is limited almost exclusively, in order of use frequency, to: (1) magnetic particle/dye penetrant, (2) ultrasonic testing (UT), (3) visual, including fiber-optic/borescope and TV, and (4) radiography. None of these techniques are adequate for reliably detecting and sizing boiler tube damage, and they suffer from low inspection volume coverage, i.e., they are limited to small localized checking of suspect troublespots. Our survey shows that boiler inspection using even these four methods is not practiced routinely but only after a forced outage has occurred. While there is a wide spectrum of boiler tube damage which results in failures forcing complete or partial outages, our survey indicates that: (1) wall thinning and wastage by erosion/corrosion, (2) overheating, and (3) hydrogen damage are the most prevalent failure modes for fossil fired boilers. Our survey also shows that at least one-quarter to one-third of the failures forcing a full outage occur in the furnace wall tube bank and reducing the number of these failures alone would result in considerable savings to the utilities. We recommend that EPRI undertake a research and development program for the purpose of providing the utilities with a practical NDE capability for inspecting boiler tubes. (ERA citation 06:006024)

IVL-B-557 PC **A03**/MF **A01**
Swedish Water and Air Pollution Research Lab., Stockholm.
Lakes as a Heat Source for Residential Heating. A Survey of Costs in Comparison with Different Systems and Ecological Consequences.
T. Hellstroem. 1980, 31p
In Swedish.
U.S. Sales Only.

The low grade energy in lakes and ground water can be used for residential heating by using heatpumps. An economic comparison of different systems has been performed. It was assumed that the temperature of the produced hot water would be 60 exp 0 C, and that the capacity would be 6500 MWh per year. The production costs have been calculated but not the distribution costs. The ecologic consequences have also been discussed. It was shown that production of energy from free water will give the lowest energy costs. In special cases groundwater would give the same price. Storage of hot water is not profitable. The ecologic effects will be quite small but there will be a decrease in biological productivity. A lake as heat source for residential heating would be economically competitive with oil. (ERA citation 06:006191)

LBL-10701 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Determination of in-Situ Performance of Fireplaces.
M. P. Modera, and R. C. Sonderegger. Aug 80, 89p
Contract W-7405-ENG-48

Investigations of the thermal performance of open fireplaces and the testing of a number of fireplace accessories are discussed. While an open fireplace heats a house by radiation, it also induces air infiltration because of the draft of the fireplace chimney. The net heat gain resulting from these counteracting effects was measured to be in the range of 5 to 7% of the wood energy consumed by the fire. This is termed the net efficiency of a fireplace. Fireplace accessories that can be inserted into an existing fireplace are commercially available. The net efficiencies cited were measured by means of a method called electric co-heating, developed at LBL. This method gauges the net heat gain from fireplaces or other heating appliances by the decrease in electric heating required to maintain a constant indoor temperature. Net fireplace efficiencies are somewhat dependent on indoor-outdoor temperature differences, on the tightness of the house, and on the flow resistance of the fireplace/chimney system. It was determined, based on wood prices of $150/cord and net efficiencies in the range of 5 to 30%, that heating with a fireplace is generally, though not always, more expensive than heating a home with conventional fuels at average efficiencies and 1980 prices. (ERA citation 06:002510)

LBL-11408 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Transparent Heat Mirrors for Windows: Thermal Performance.
M. Rubin, R. Creswick, and S. Selkowitz. Aug 80, 7p CONF-801016-16
Contract W-7405-ENG-48
National passive solar conference, Amherst, MA, USA, 19 Oct 1980.

The thermal performance of a window system can be improved by the application of a transparent heat mirror coating. Ways in which optimum thermal performance can be achieved for a variety of conventional and advanced window designs are discussed. Residential applications are emphasized. (ERA citation 06:002217)

N81-15460/1 PC **A03**/MF **A01**
La Quinta Motor Inns, Inc., San Antonio, TX.
Solar Domestic Hot Water System Installed at Texas City, Texas.
Final Technical rept.,
Dec 80, 29p NASA-CR-161605
Contract EG-77-G-01-1670
Sponsored in Part by NASA.

This is the final technical report of the solar energy system located at LaQuinta Motor Inn, Texas City, Texas. The system was designed to supply 63 percent of the total hot water load for a new 98 unit motor inn. The solar energy system consists of a 2100 square feet Raypack liquid flat plate collector subsystem and a 2500 gallon storage subsystem circulating hot water producing 3.67 x 10 to the 8th power Btu/year. Abstracts from the site files, specification references, drawings, installation, operation, and maintenance instructions are included.

PATENT-4 184 536
Not available NTIS
Department of Energy, Washington, DC.
Heat Rejection System.
Patent,
G. C. Smith, R. D. Tokarz, H. L. Parry, Jr., and D. J. Braun. Filed 22 Feb 78, patented 22 Jan 80, 8p PAT-APPL-880 254
Supersedes PAT-APPL-880 254-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A cooling system for rejecting waste heat consists of a cooling tower incorporating a plurality of coolant tubes provided with cooling fins and each having a plurality of cooling channels therein, means for directing a heat exchange fluid from the power plant through less than the total number of cooling channels to cool the heat exchange fluid under normal ambient temperature conditions, means for directing water through the remaining cooling channels whenever the ambient temperature rises above the temperature at which dry cooling of the heat exchange fluid is sufficient, and means for cooling the water. (ERA citation 06:006031)

PB81-147365 PC **A07**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
User Acceptance of an Energy Efficient Office Building--A Study of the Norris Cotton Federal Office Building.
Final rept.,
Jacqueline Elder, and Robert L. Tibbott. Jan 81, 130p NBS-BSS-130
Library of Congress catalog card no. 80-600188.
Sponsored in part by Department of Energy, Washington, DC. Office of Building and Community Systems.

The General Services Administration built the Norris Cotton Federal Office Building in Manchester, New Hampshire and chose it as a demonstra-

tion project for studying the effectiveness of energy conservation techniques in the design and operation of a contemporary office building. User acceptance of both the innovative and conventional design features in the building was measured by administering a questionnaire to employees shortly after occupancy of the building and again eight months later.

PB81-150112 PC **A03**/MF **A01**
Auburn Univ., AL. Dept. of Mechanical Engineering.
Energy Code Manuals for HVAC Systems, HVAC Equipment, Service Hot Water.
Procedure manual,
J. S. Goodling. 1978, 30p NSF/RA-780720
Grants NSF-ISR71-03842, NSF-DI-39498

This manual guides engineers inconforming to ASHRAE Standard 90-75 specifications for heating, ventilating, and air conditioning systems. The HVAC Systems and their design parameters are examined. The Code requires that detailed calculations be made to determine heating and cooling loads, and sets limits for the input parameters. The four load design parameters specified are outdoor design conditions, indoor design conditions, ventilation rates, and infiltration rates, all of which are explained and illustrated. Humidity and temperature controls are discussed together with simultaneous heating and cooling. Standardization requirements are given for ventilation systems, the air transport factor, energy recovery systems, piping insulation, air handling ducts, and ductwork. Requirements are also indicated for the efficient maintenance of HVAC equipment and HVAC systems components in new buildings. Included are suppliers' responsibilities and minimum performance levels acceptable for these systems. A discussion on service hot water deals with maximum values of heat loss for water heaters, storage tanks, and associated piping of heating equipment used for domestic, sanitary, and swimming pool purposes. Computational formulas are presented and illustrated with actual case examples.

PB81-169484 PC **A07**/MF **A01**
Johns-Manville Sales Corp., Denver, CO. Research and Development Center.
Fiber Glass Mat/Mechanical Fastener Covering System. Volume A: Description, Installation Instructions, and Test Data.
Final rept.
03 Apr 79, 136p HUD-0001567
Contract HUD-H-2261R

A wall - covering system is described which can cover peeling and flaking paint or lead - based paint and reduce air infiltration through walls (conserve energy). The system involves the application of a thin (22 mil.), lightweight (1.4 pound per 100 square feet), but strong glass fiber mat to the walls with an adhesive. A topcoat of the adhesive is applied to the glass fiber mat which has been bonded to the wall. The fiberglass mat acts as a reinforcing agent for the adhesive. Conventional paint is then applied. The system markedly strengthens walls and covers cracks; it can be extended over woodwork and trim. The adhesive found to be most effective is a mixture of one part (by volume) of Hadley Adhesive No. 1181 and three parts of Sherwin - Williams PVA Interior / Exterior Masonry Primer. Test data using this blend are provided. The system, using this adhesive, was successfully installed in the Advanced Energy Utilization Test Bed house at the Navy Civil Engineering Laboratory at Port Hueneme, Calif. Other adhesives that may be substituted are listed. Tabular and graphic data are provided, and supplementary materials are appended.

PB81-169625 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Description of the Data Acquisition and Instrumentation Systems: Jersey City Total Energy Project. Volume 9,
Charles Bulik, William G. Rippey, C. W. Hurley, and Daniel E. Rorrer. Mar 79, 160p NBSIR/79-1709, HUD-0001674

Under the sponsorship of HUD, the National Bureau of Standards (NBS) gathered engineering data on an operating diesel total energy plant which supplies all electrical power, hot water, and chilled water to a 485 - unit apartment and commercial building complex in Jersey City, N. J. Engineering data were continuously collected from April 1975 to December 1978 by a data acquisition system (DAS) which recorded the outputs from approximately 200 sensors located in the plant and site buildings. This report describes the design and operation of the instrumentation system and the DAS used to monitor the total energy plant and certain utility services to the site buildings. The report contains a description of the types, characteristics, and locations of instruments used to measure physical variables. The capabilities and operational modes of the DAS components are described in detail. The report also contains a brief description of the total energy plant and site, instrument costs, data processing procedures, and some of the instrumentation problems encountered. A total of 52 figures and 7 references are included. Site facilities drawings, a data acquisition list, data specifications, and a venturi flow calibration report are appended. (Author abstract modified).

PB81-169633 PC **A14**/MF **A01**
Nottingham (H.D.) and Associates, Inc., McLean, VA.
Design Cost and Operating Data for Alternate Energy Systems for the Summit Plaza Complex, Jersey City, New Jersey. Volume 15, Part 1.
Final rept.
May 79, 312p HUD-0001676, NBS-GCR-79-164
Contract NBS-5-35870

This study develops basic design and operating data for a comparison of alternate methods of supplying heating, cooling, and electric power to a residential / commercial complex. The community complex studied is the Summit Plaza Development located in Jersey City, N.J. The development has been served by a Total Energy (TE) plant since January 1974. The performance and overall viability of the TE facility are analyzed. Included in the study are an analysis of the installed energy system, conceptual design of alternate energy systems, estimates of the capital costs of the existing system and of each alternate system, estimates of the operation and maintenance costs of the existing system and alternate systems, and simulation of the energy systems operating through a typical year to determine energy demands and consumptions. This report shows the initial costs of the 12 systems. It notes that 5 of the 12 systems could be considered higher initial cost systems, with initial costs ranging from $6,620,000 to $7,940,000. Four of the 12 systems would fall into the medium range, and 3 of the 12 could be considered lower - range initial cost systems. However, the five higher initial cost systems consume, on average, 57 percent of the energy consumed by the lower initial cost systems. Estimated annual maintenance costs for each system are identified. The report recommends that a life - cycle cost analysis with appropriate economic discount rates and cost - escalation factors be performed to quantify the trade off between the energy efficient high - first - cost systems and the energy inefficient low - first - cost systems. Appendices present the cooling, heating, and electrical load analyses; conceptual systems design; equipment performance data; construction costs; estimated maintenance and replacement costs; and systems simulation. Tabular data and a site plan are also included.

PB81-169641 PC **A07**/MF **A01**
Nottingham (H.D.) and Associates, Inc., McLean, VA.
Detailed Initial Cost Data for Alternative Energy Systems for the Summit Plaza Complex, Jersey City, New Jersey. Part 15. Part II.
May 79, 141p HUD-0001677, NBS-GCR-068327000
Contract NBS-5-35870
Sponsored in part by Department of Housing and Urban Development,Washington, DC. Div. of Energy, Building Technology and Standards.

Summit Plaza, a residential / commercial development located in Jersey City, N. J., consists of four apartment buildings, a commercial office building, and a school building, and it is served by a Total Energy System. The total development contains 485 apartment units and 573,780 square feet of occupied space. Its Total Energy System has the following characteristics: (1) electric power is generated onsite by diesel engine generators; (2) waste heat recovered from the diesel generators is used for building heating and for generating domestic hot water; and (3) when heating requirements are larger than those that can be met by the diesel heat recovery system, supplemental oil - fired boilers are used to increase the heat supplied to meet the heating demand. This report derives detailed estimates of the construction costs of 12 alternate energy systems which might be used for comparison to the existing Total Energy plant at Summit Plaza. The alternate systems could supply heating, cooling, and electrical services to the complex. Construction costs are developed for each system in the report by a quantity take - off for all major and minor equipment for each energy system, including the individual electrical and mechanical components of the energy conversion equipment, site distribution, equipment, building terminal equipment, etc. The detailed data in the report are summarized in a related report which develops the energy performance and costs for the energy system. Extensive tabular data are provided. (Author abstract modified).

PB81-802472 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cryogenic Refrigeration. November, 1977-1980 (Citations from the NTIS Data Base).
Rept. for Nov 77-1980.
Jan 81, 189p
Supersedes PB80-802051, and NTIS/PS-78/1262. See also 1964-1972, NTIS/PS-75/825, and 1973-October, 1977, NTIS/PS-78/1261.

Topics in the cited reports include cryogenic cooling of electronic equipment, infrared equipment, cryogenic storage vessels, magnetohydrodynamic generators, and superconducting magnets, coils, rotating machinery, and transmission lines. Marine refrigeration of liquefied natural gas, cryogenic heat pipes, cryogenic heat transfer, and space applications are studied. Methods investigated include adiabatic demagnetization, electrocaloric effect, Joule-Thomson effect, thermoelectric cooling, and Crayton, Claude, Gifford-McMahon, Sterling, and Vuilleumier cycles. (This updated bibliography contains 182 citations, 57 of which are new entries to the previous edition.)

PB81-803199 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Space Heating and Air Conditioning. October, 1978-October, 1979 (Citations from the NTIS Data Base).
Rept. for Oct 78-Oct 79.
Feb 81, 232p
See also 1964-1975, NTIS/PS-77/0826, 1976-August, 1977, NTIS/PS-78/1014, and September, 1977-September, 1978, PB80-801707.

Design, technical feasibility, performance, and economic factors pertaining to solar heating and cooling of buildings are discussed. Commercial buildings, schools, and residential buildings, are covered, with emphasis on the assessment of solar heating and cooling systems for residential buildings. Included are a few abstracts of reports on solar energy as a national energy resource; solar energy research program alternatives; and social, environmental, and institutional factors affecting the feasibility of using solar energy for heating and cooling buildings. (This updated bibliography contains 225 citations, none of which are new entries to the previous edition.)

PB81-803207 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Space Heating and Air Conditioning. November, 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for Nov 79-Jan 81.
Feb 81, 233p
Supersedes PB80-801715, and NTIS/PS-78/1015. See also 1964-1975, NTIS/PS-77/0826, 1976-August, 1977, NTIS/PS-78/1014, and September, 1977-September, 1978, PB80-801707.

Design, technical feasibility, performance, and economic factors pertaining to solar heating and cooling of buildings are discussed. Commercial

buildings, schools, and residential buildings are covered, with emphasis on the assessment of solar heating and cooling systems for residential buildings. Included are a few abstracts of reports on solar energy as a national energy resource; solar energy research program alternatives; and social, environmental, and institutional factors affecting the feasibility of using solar energy for heating and cooling buildings. (This updated bibliography contains 226 citations, all of which are new entries to the previous edition.)

PB81-803462 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Passive Solar Space Heating and Cooling. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 179p
Supersedes PB80-801731.

Design, technical feasibility, performance, and economic factors pertaining to passive solar heating and cooling of buildings are discussed. Abstracts cover trombe walls and air thermosiphon solar heating systems, comparative economics of passive and active systems, and performance simulation studies. (This updated bibliography contains 171 citations, 113 of which are new entries to the previous edition.)

PB81-803470 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Passive Solar Space Heating and Cooling. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 221p
Supersedes PB80-801749.

Studies from worldwide literature on the passive solar heating and cooling of buildings are discussed. Abstracts cover design and performance simulation studies of trombe walls and air thermosiphon solar heating systems. (This updated bibliography contains 214 citations, 169 of which are new entries to the previous edition.)

SERI/TR-333-320 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Appropriate Sizing of Solar Heating Systems.
P. Bendt. Sep 80, 33p
Contract AC02-77CH00178

It is generally assumed that a solar heating system should be sized by minimizing its life cycle cost. This study shows, however, that the uncertainty in future economic trends makes the results of such a procedure questionable. The design conditions for minimum cost are extremely broad and all practical systems have a solar fraction within the limited range of 30% to 90%. Thus, by choosing only three collector areas that give systems within this range, one is assured of selecting a nearly optimal system for any realistic economic scenario. Selecting one of these three systems is essentially equivalent to economic optimization, but simpler. Procedures are derived in this paper for determining the sizes of the three systems. The conclusion is that the collector areas should be about 1/8, 1/5, and 1/3 of the building floor area. This rule of thumb eliminates the need to design solar systems individually, allowing the possibility of mass-produced homes with standardized solar heating systems. (ERA citation 06:002224)

SIB-D-5-1979 PC **A03**/MF **A01**
Swedish Council for Building Research, Stockholm.
District Heating for Diminished Density of Heating Requirements.
N. Dafgaard. 1979, 44p
U.S. Sales Only.

District heating for diminished density of heating requirements is discussed. The study attempts to calculate the relative changes in costs that are created by alterations of the density of heating requirements in areas served by district heating plants. The study has assumed that heat is produced in a central hot water plant and that the installation costs also include the costs of sub-stations. The following conclusions were drawn: the economic size of the control plant increases with increases in the heating density; the economic size of the central plant is often less than 50 MW; cost increases per unit of heat when the heating density is reduced in the area served by a district heating plant; cost increases per unit of heat when a network is extended are much greater than if the network was operated at much lower power. (ERA citation 06:006217)

SOLAR/2019-80/14 PC **A07**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
South Dakota School of Mines, Keystone, South Dakota: Solar Energy System Performance Evaluation, December 1979-May 1980.
J. H. Klotz. 1980, 127p
Contracts AC01-76CS32399, AC01-79CS30027

Performance of the South Dakota School of Mines solar energy system from December 1979 to May 1980 is described. The system is installed in the Mt. Rushmore National Memorial Visitors' Center near Keystone, South Dakota. The site is located at 44 exp 0 N latitude and 1600 m elevation. The building has 540 m exp 2 of conditioned space and a design overall thermal transfer coefficient (UA) of 0.22 GJ(exp 0 C/sub <21/ d) exp -1 . The solar energy system is of liquid-based active type, with 187 m exp 2 of flat-plate collector area and 11.4 m exp 3 of water thermal storage. The site experienced average irradiance of 155 WM exp -2 and average ambient temperature of 2 exp 0 C during the period described. Under these conditions, the solar energy system supplied 43% of the energy required for space heating, saving 3790 liters of fuel oil that would otherwise have been burned. Storage temperature set points for energy supply to space heating were investigated during the season, and results of the investigation are described. The regime of 38 exp 0 C threshold and 32 exp 0 C cutoff temperature was found to be optimal. (ERA citation 06:005947)

13B. Civil Engineering

AD-A093 551/0 PC **A18**/MF **A01**
Federal Emergency Management Agency, Washington, DC. Office of Mitigation and Research.
Early Progress to Implement the Federal Guidelines for Dam Safety and Recommendations to Improve Federal Dam Safety Programs.
Bruce A. Tschantz. 30 Jul 80, 416p Rept no. M/R-1

President Carter directed each of the Federal agencies responsible for dam safety to implement the new Federal Guidelines for Dam Safety on October 4, 1979. He also directed the major agency heads to report their progress toward implementing the Guidelines to the FEMA Director by January 31, 1980. This report summarizes and transmits these agency progress reports and two overall progress evaluation reports--one by a Federal Task Subcommittee of the Interagency Committee on Dam Safety and the other by a FEMA-sponsored independent consulting Panel. The reports show that agencies have made major progress in the areas of organizational management, operation and maintenance, periodic inspection, initiating emergency action planning, staff training, external reviews, interagency coordination, and initiating actions to correct major dam deficiencies. Problems remain in agency personnel staffing and funding for dam safety, correcting deficiencies in Federally-built or -assisted private dams, regulating mine tailings dams, implementing emergency action plans at hazardous dams, and performing systematic remedial work at deficient dams. Detailed information and insight about agency progress, remaining problems, and recommendations directed to FEMA and the other agencies for improving Federal dam safety procedures are contained in the three attached documents.

AD-A093 696/3 PC **A08**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Basic Pile Group Behavior.
Final rept.,
Joseph Hartman. Dec 80, 171p Rept no. WES-TR-K-80-5

This report describes a computerized method for pile group design and analysis, as practiced by the Corps of Engineers, and proposes criteria for systematizing this method in a new computer program. Example problems are included. An overview of advanced methods of pile design and a brief discussion on selections of pile types, methods of installation, and allowable stresses are also presented. Estimation of soil moduli for laterally loaded piles and computation of pile stiffness coefficients for various soil conditions that are needed for the analysis are also discussed. (Author)

AD-A093 817/5 MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Spill Assessment Model (SAM) Procedure for Manual Field Calculations.
Final rept. Feb 79-Feb 80.
Richard G. Potts, John H. Hagopian, and George W. Schlossnagle. Apr 80, 101p AFESC/ESL-TR-80-22
Contract F08635-79-C-0084
Availability: Microfiche copies only.

The objective of the field procedure is to provide a means of rapidly assessing the approximate extent of concentrations in water in excess of hazard levels by application of the spill assessment model (SAM). This manual provides a simple calculation procedure that can be rapidly applied in the field to obtain estimates of the potential extent of hazard levels from a discharge of soluble hazardous materials into navigable waterways. These field procedures have been derived from complex analytical and computer based models describing the behavior of certain types of spilled chemicals in water as developed in ESL-TR-80-07. The calculation procedures for field use have been developed in the form of a series of graphs and tables, and permit hazard extent estimates to be rapidly made when time or resources are not available for more complex computation. The data required for these field computations can be immediately obtained or estimated. The procedures for field use may be applied to obtain estimates of the concentration in water resulting from the spill of a soluble chemical having a density close to that of water. It is assumed that the chemical is fully soluble in water, and that all the discharged chemical goes into solution with water. In particular, effects of chemical reactions, phase changes, or vaporization from a spreading liquid are not incorporated; These assumptions lead to estimates of concentrations in water that are conservative. The part of SAM utilized as the basis for the field calculations addresses only instantaneous point source discharges into a flowing river.

AD-A093 826/6 PC **A07**/MF **A01**
Coast Guard Research and Development Center, Groton, CT.
State-of-the-Art Survey of Hardware Delivery and Damage Inspection Methods for Coast Guard Hazardous Chemical Spill Response.
Final rept.,
R. T. Walker. Aug 80, 130p CGR/DC-5/80, USCG-D-67-80

This report is a study of methods that might be used by the Coast Guard, in accomplishing three tasks when responding to a hazardous chemical spill originating from a tank vessel or barge in the marine environment. The specific tasks are: (1) Damage inspection of the endangered vessel; (2) Delivery of Coast Guard hazardous chemical patching and plugging devices (e.g., polystyrene foam plug, evacuated foam plug, air/water inflatable bags); and (3) Delivery of a chemical sensor for venting rate measurements, sampling, and analysis for the detection, identification, and quantification of hazardous chemical pollutants. Mission requirements and hardware design goals are established. All possible methods are reviewed and subjected to a weighted factor evaluation. The results of the evaluation indicate the most promising approach is through the application of a Remotely Operated Vehicle (ROV). Detailed information of ROVs is compiled and presented. (Author)

AD-A093 931/4 PC **A02**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
A Pollution Abatement Concept; Minimum Solvents List of Solvent Cleaners Recommended for Use at the Naval Air Rework Facilities.
Phase rept.,
H. J. Lee. 22 Oct 80, 8p Rept no. NADC-80195-60

There are many different types of solvents used for cleaning applications by the Navy. Studies indicate that, in some instances, several kinds of solvents are used individually for the same cleaning processes. To achieve the pollution abatement parameter, a study was conducted to determine the feasibility of minimizing the number of solvents for cleaning operations of the Naval facilities. The study has resulted in the establishment of a recommended minimum solvents list for use by Naval Air Rework Facilities (NAVAIREWORKFACS). (Author)

AD-A094 003/1 PC **A12**/MF **A01**
Air Force Engineering and Services Center, Tyndall AFB, FL. Engineering and Services Lab.
Analysis for the Accuracy Definition of the Air Quality Assessment Model (AQAM) at Williams Air Force Base, Arizona. Volume II Appendices.
Final rept. Jul 76-Mar 80,
R. J. Yamartino, L. A. Conley, D. M. Rote, F. J. Lamich, and E. P. Dunphy. Mar 80, 261p Rept no. AFESC/ESL-TR-80-19-VOL-2
See also Volume 1, AD-A091 171.

The Air Quality Assessment Model (AQAM) overall predictive accuracy is analyzed using actual air base ambient air quality measurements. These measurements of CO, No, NOX, THC, CH4, and visibility at Williams Air Force Base, Arizona, from June 1976 to June 1977 were compared with AQAM predicted air pollution concentrations to determine AQAM's predictive power. The AQAM accuracy is analyzed on an hour-by-hour basis and statistical basis using accumulative frequency distribution. The conclusions are that AQAM accuracy is well within the accuracy range expected for Gaussian urban dispersion models. Even though an attempt was made to select an isolated base from urban background emissions, the background concentration had to be accounted for in the analysis. Concentrations in the air base vicinity were extremely low when compared with background concentrations resulting from urban transport. Without the background concentration adjustments, the AQAM model tended to underpredict the pollutant concentrations. The results also indicate that AQAM is especially accurate in simulating the potential worst case airbase concentrations associated with morning hours, low wind speeds, stable atmospheric conditions, and high activity. (Author)

ANL/EES-TM-107 PC **A08**/MF **A01**
Hart (Fred C.) Associates, Inc., New York.
New Source Performance Standards for Industrial Boilers. Volume 5. Analysis of Solid Waste Impacts.
K. Boldt, H. Davis, B. Delaney, N. Grundahl, and R. Hyde. Sep 80, 168p
Contract W-31-109-ENG-38

This study provides an analysis of the impacts of emission controls on disposal of solid wastes from coal-fired industrial boilers. Examination is made of boiler systems, coal types, emission control alternatives, waste streams, waste disposal and utilization alternatives, and pertinent Federal regulations. Twenty-four representative model case scenarios are studied in detail. Expected disposal/utilization alternatives and disposal costs are developed. Comparison of the systems studied indicates that the most cost-effective SO sub 2 control technologies from the perspective of waste disposal cost per unit SO sub 2 control are, in decreasing order: physically cleaned coal/double alkali combination; double alkali; lime/limestone; spray drying; fluidized-bed combustion; and sodium throwaway. (ERA citation 06:006475)

DOE/RG/10327-01 PC **A04**/MF **A01**
Labadie (John R.), Seattle, WA.
Electric Power Emergency Handbook.
J. R. Labadie. Sep 80, 70p
Contract AT01-80RG10327

The Emergency Electric Power Administration's Emergency Operations Handbook is designed to provide guidance to the EEPA organization. It defines responsibilities and describes actions performed by the government and electric utilities in planning for, and in operations during, national emergencies. The EEPA Handbook is reissued periodically to describe organizational changes, to assign new duties and responsibilities, and to clarify the responsibilities of the government to direct and coordinate the operations of the electric utility industry under emergencies declared by the President. This Handbook is consistent with the assumptions, policies, and procedures contained in the National Plan for Emergency Preparedness. Claimancy and restoration, communications and warning, and effects of nuclear weapons are subjects covered in the appendices. (ERA citation 06:002469)

EPRI-CS-1579(V.2) PC **A11**/MF **A01**
Radian Corp., Austin, TX.
Evaluation of Chiyoda Thoroughbred 121 FGD Process and Gypsum Stacking. Volume 2. Chiyoda Evaluation Appendixes. Final Report.
G. P. Behrens, and O. W. Hargrove. Oct 80, 237p

A six-month evaluation of the Chiyoda Thoroughbred 121 Prototype Process (CT-121) was conducted at the Scholz Electric Generating Station of Gulf Power Company. The 23-megawatt CT-121 prototype was modified from existing CT-101 process equipment at Scholz by Chiyoda International Corporation, a subsidiary of Chiyoda Chemical Engineering and Construction Company, Ltd. Chiyoda operated the prototype, and the Electric Power Research Institute and Southern Company sponsored technical evaluations of the prototype process performance and gypsum waste disposal options in the 1978-1980 time period. This pilot-scale evaluation indicates that the CT-121 scrubbing system is an attractive alternative to other available FGD technologies based on lime and limestone. The prototype scrubber at the Scholz plant operated reliably and efficiently, under a variety of test conditions, while treating flue gas from a coal-fired utility boiler. The process has the potential of reducing levelized costs by about 10%, compared to conventional limestone scrubbing. The major results are given. (ERA citation 06:005688)

EPRI-CS-1579(V.3) PC **A08**/MF **A01**
Ardaman and Associates, Inc., Orlando, FL.
Evaluation of Chiyoda Thoroughbred 121 FGD Process and Gypsum Stacking. Volume 3. Testing the Feasibility of Stacking FGD Gypsum. Final Report.
J. E. Garlanger, and T. S. Ingra. Nov 80, 162p

Forced-oxidation flue gas desulfurization (FGD) scbbers can produce significant quantities of waste gypsum, which, if not utilized, require safe and economical disposal. Gypsum is also a waste product of the phosphate fertilizer industry, which has successfully utilized stacking methods of waste disposal for more than 20 years. Results from geotechnical laboratory testing of Chiyoda Thoroughbred 121 (CT-121) FGD gypsum are presented. These results indicate CT-121 FGD gypsum has settling, dewatering, and structural characteristics similar to and, in some instances, more favorable than phosphate gypsum, making stacking methods of waste disposal a possible option for disposing of FGD gypsum. The construction and nine-month operation of a one-half acre, 12-foot-high prototype CT-121 FGD gypsum stack at the Scholz plant is also discussed. The success of this installation further confirms the feasibility of utilizing stacking for disposal of FGD gypsum. Basic concepts concerning the design and management of gypsum stacks in the phosphate industry are presented to illustrate the stacking method as it may be adopted by the utility industry for stacking FGD gypsum. (ERA citation 06:005689)

FE-3269-32 PC **A04**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ. Power Systems Div.
Design, Construction, Operation and Evaluation of a Prototype Culm Combustion Boiler/Heater Unit. Technical Progress Report, April 1-June 30, 1980.
Aug 80, 51p CW-WR-78-036.32A
Contract AC21-78ET12307

This report provides a summary of the work performed on the Prototype Culm Combustion Boiler/Heater Unit, Phase I - Engineering Design and Analysis and Phase II - Prototype Plant Construction. The objectives of the program as well as the technical progress and problem areas encountered are presented. The 90% design review meeting was held at the DOE Morgantown Energy Technology Center on June 4, 1980 resulting in no outstanding action items. Final design activity is continuing and the progress on drawing preparation and procurement activity is discussed. Processing of the construction bid package and awarding of the contrast is discussed. Based on authorization for a limited amount of Phase II activity on November 2, 1980, purchase orders were released authorizing preparation of certified drawings for fabricated equipment required to support the Phase I final design activity and based on full Phase II authorization on March 20, 1980, procurement of fabricated equipment was initiated and is now underway. The prototype plant site has been cleared and leveled, and boiler concrete foundations have been installed. Stone roadways were completed. Construction of the access roadway has been rescheduled to August 1980. (ERA citation 06:005691)

IS-M-304 PC **A02**/MF **A01**
Ames Lab., IA.
Economics of Metals Recovery from Power Plant Fly Ash Via the Ames HiChlor Process.
S. J. Weiss, G. Burnet, and C. Y. Chang. 1980, 12p CONF-8010147-1
Contract W-7405-ENG-82
UMR-DNR conference on energy, Rolla, MO, USA, 14 Oct 1980.

The disposal of potentially hazardous coal wastes is becoming a significant problem for the power industry. The Ames HiChlor process, which utilizes power plant fly ash as a source of aluminum, is proposed as a method of coal waste utilization. In the HiChlor process fly ash is chlorinated in the presence of a carbonaceous reductant at 700 to 900 exp 0 C to produce aluminum chloride and titanium tetrachloride as salable products. An economic analysis for a plant which would process 6000 tons per day of fly ash is presented. Conditions under which the proposed process will prove profitable are discussed. (ERA citation 06:005692)

LA-8619-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Simulation of Large-Scale Liquefied Natural Gas Vapor Dispersion.
E. J. Chapyak. Dec 80, 24p
Contract W-7405-ENG-36

Two techniques are examined that show promise for the simulation of vapor dispersion resulting from large-scale spills of Liquefied Natural Gas (LNG) - wind tunnel simulations and small-scale field tests. Particular emphasis is placed on identifying simulation deficiencies and on how data generated by these techniques could be used to infer the physical characteristics of large-scale LNG vapor clouds. (ERA citation 06:005768)

NUREG/CR-0912-V-2 PC **A16**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Geoscience Data Base Handbook for Modeling a Nuclear Waste Repository. Volume 2.
Final rept. Aug 78-Dec 79,
Dana Isherwood. Jan 81, 355p UCRL-52719-VOL-2
See also Volume 1, NUREG/CR-0912-V-1.

This handbook contains reference information on parameters that should be considered in analyzing or modeling a proposed nuclear waste repository site for high-level, transuranic and spent-fuel waste. Volume 2 is the result of a scoping study for a data base on the geology, geomechanics and hydrology of shale, granite, and basalt as alternative repository media. Except for the geomechanics of shale, most of the sections contain relatively com-

plete compilations of the available data, as well as discussions of the properties that are unique to each rock type.

N81-15579/8 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Annoyance Caused by Noise around Airports.
Final rept.,
Jul 80, 114p NASA-TM-75784, DGRST/CSTB-63-FR-138
Contract NASW-3198
Transl. Into English of "La Gene Causee Par le Bruit Autour des Aeroports" Rept. D.G.R.S.T./C.S.T.B.-63-Fr-138 Centre Sci. Et Tech. Du Batiment, Paris, 1 Mar. 1968 p 1-219. Transl. By Scientific Translation Service, Santa Barbara, Calif.

A comprehensive study of noise around selected airports in France was performed. By use of questionnaires, the degree of annoyance caused by aircraft noise was determined. Three approaches used in the study were: (1) analytical study on the influence of noise on sleep; (2) sociological study on the satisfaction of occupants of buildings which conform to laws which are supposed to guarantee sufficient comfort; and (3) statistical study of correlations between external noises and psychological and pathological disturbances in residences.

N81-15580/6 PC **A04**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Aircraft Annoyance Evaluations Using Field and Laboratory Simulation Techniques.
G. W. Johnston, and A. A. Haasz. Dec 80, 60p UTIAS-248, ISSN-0082-5255
Sponsored in Part by Transport Canada.

A series of aircraft noise annoyance evaluation tests were performed under controlled conditions in a laboratory. Jurors drawn from nominal 30-35 NEF zones were exposed to aircraft noise events previously recorded near their homes in the vicinity of the Toronto International and Oshawa General Aviation Airports. Comparison of test results indicates that under optimum simulation conditions both Toronto and Oshawa observers consistently rate the International Airport noise exposure as considerably more disturbing/annoying than that at the General Aviation Airport sites. The laboratory test results were also compared with conventional field interview annoyance data obtained for the same group of jurors in a previous study conducted by McMaster University.

ORNL/TM-6783 PC **A17**/MF **A01**
Oak Ridge National Lab., TN.
Strategies for Ecological Effects Assessment at DOE Energy Activity Sites.
F. S. Sanders, S. M. Adams, L. W. Barnthouse, J. M. Giddings, and E. E. Huber. Dec 80, 389p
Contract W-7405-ENG-26

Guidance for the monitoring and assessment of ecological impacts resulting from DOE energy production activities has been developed to improve the accuracy of analysis under the National Environmental Policy Act. Basic concepts in monitoring and assessment that can be adapted to site-specific circumstances are stressed. Four major areas of activity that sould be integrated into a comprehensive interdisciplinary assessment program are: field monitoring; laboratory studies; experimental field perturbation studies; and mathematical modeling, both statistical and ecological. Each of these areas is discussed with respect to terrestrial, marine, and freshwater environments. Appendices are included that provide references to sampling methodologies. (ERA citation 06:006490)

PB81-128175 PC **A02**
Wisconsin Univ.-Madison.
Mechanics of Coastal Landslides and the Influence of Slope Parameters,
T. B. Edil, and L. E. Vallejo. c1980, 17p WIS-SG-80-716, NOAA-80120103
Pub. in Engineering Geology 16, p83-96 1980.

An overview of the physical processes as they affect slope evolution, the available mechanical models, and the influence of slope parameters on the stability of the coastal bluffs are presented. The response of coastal slopes to the action of these factors is viewed as shallow failures and downslope transport as well as deep rotational slips. A distinction between the stability against deep slips which is termed as quasi-stability and the ultimate stability is made. The progress of slope evolution in coastal bluffs can be predicted with successive applications of the two-dimensional circular slip limit equilibrium analysis of slope stability using the effective stress method. (Copyright (c) 1980 Elsevier Scientific Publishing Company.)

PB81-141673 PC **A07**/MF **A01**
Statens Vaeg- och Trafikinstitut, Linkoeping (Sweden).
Annual Report 1978/79.
1980, 135p

Contents: The duties and organization of the National Swedish Road and Traffic Research Institute; The 'Road transport planning' program; The 'Roads' program; The 'Vehicle' program; The 'Road user' program; The 'Traffic process' program; Information and documentation activities; The technical section of the administrative division; The ADP section of the administrative division; Seminars arranged by the Institute; International collaboration; Collaboration with universities and colleges; and Finances.

PB81-145591 PC **A05**/MF **A01**
KLD Associates, Inc., Huntington, NY.
Development and Testing of INTRAS, a Microscopic Freeway Simulation Model. Volume 3. Validation and Application.
Final rept.,
R. B. Goldblatt. Oct 80, 91p KLD-TR-72, FHWA/RD-80/108
Contract DOT-FH-11-8502
See also PB-258 994.

The series of volumes documents the work performed to adapt a freeway simulation model for studying freeway incidents. The resulting program, INTRAS (INtegrated TRAffic Simulation), is a vehicle-specific time-stepping simulation designed to realistically represent traffic and traffic control in a freeway and surrounding surface street environment. This volume describes the detailed procedures needed to apply the INTRAS Program to the study of traffic operations in a freeway environment. This volume is the third in the series. The others in the series are: Vol. 1. -- Program Design, Parameter Calibration and Freeway Dynamics Component Development; Vol. 2. User's Manual; and Vol. 4. Program Documentation.

PB81-146797 PC **A04**/MF **A01**
Glass and Ceramics International, Inc., Lomita, CA.
Energy Conservation in the Building Industry Using Industrial Waste Materials - Phase I.
Final rept. 1 Oct 79-31 Mar 80,
M. Akbar Ali. 1980, 60p NSF/RA-800311
Grant NSF-DAR79-16706

The primary objective of the study was to utilize Californian waste fly ash, pozzolan, and other regional waste materials and to conduct a feasibility study to develop potential building products. The scope of the study included the physical, chemical, and mineralogical characterization of the fly ash and waste cement, and processing and characterization of the materials. Techniques were used involving the fabrication of test samples using a hydraulic press and development of a curing procedure to form a cement bond. Samples were tested using the pozzolanic index and freeze-thaw tests to determine their essential properties including compressive strength, and to identify mineralogical phases (cementatious bonds). Without the use of any energy compressive strength of over 2000, PSi were achieved. The pozzolanic index test was better than the ASTM requirements and the samples withstood a 25 cycle freeze-thaw test.

PB81-146839 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Direction Finding from Arterials to Destinations.
Final rept.
Sep 80, 58p TRB/NCHRP/SYN-71, ISBN-0-309-03031-5
Sponsored in part by Federal Highway Administration, Washington, DC., and American Association of State Highway and Transportation Officials, Washington, DC. Also pub. as ISSN-0547-5570. Report on National Cooperative Highway Research Program, Synthesis of Highway Practices. Library of Congress catalog card no. 80-54090. Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The synthesis will be of special interest and usefulness to highway engineers and others who seek information on methods employed to aid motorists in finding the way to desired destinations after exiting from the arterial network. Examples of relevant federal and state standards and regulations are included in this report. Highway agencies have developed various procedures to assist motorists in finding the way from arterial highways to destinations in unfamiliar areas. The report documents the range of technical, legal, political, social, and environmental factors affecting the development of information systems designed to meet drivers' direction-finding information needs.

PB81-147324 PC **A03**/MF **A01**
Washington Univ., Seattle. Dept. of Civil Engineering.
Water Quality Impacts Associated with Leachates from Highway Woodwastes Embankments.
Research rept. no. 4 (Interim),
Kurt H. Vause, John F. Ferguson, and Brian W. Mar. Sep 80, 41p WA-RD-39.1

The installation of woodwaste fills, according to current design in Washington, involves excavation of native material and old roadway, usually to below the groundwater table. Important considerations in the design are long-term stability and potential environmental impacts associated with woodwaste instead of native material. The deterioration of the woodwaste results directly in release of water pollutants. The report describes the pollutants monitored from these woodwaste fills.

PB81-147340 PC **A08**/MF **A01**
Tennessee Valley Authority, Chattanooga. Office of Natural Resources.
Transport and Transformation of Sulfur Oxides through the Tennessee Valley Region,
Timothy L. Crawford, and Lawrence M. Reisinger. Jun 80, 152p EPA-600/7-80-126

This report is directed to scientists interested in the long-range atmospheric transport and transformation of sulfur compounds. Statistical and climatological analyses of historical data and the results of two long-range transport studies are presented. The two long-range atmospheric transport field studies were conducted over a 300-sq km area of the southern United States centered on the Tennessee Valley region. The first study was conducted during the spring of 1976, and the second was conducted during the summer of 1977. The field study region contains seven large coal-fired power plants and one large city. Results indicate that the predominant flow and mass transport direction is from the southwest to the northeast. Also, aerometric measurements obtained by aircraft and ground sampling compared favorably with results obtained with an analytical transport-transformation model developed for this study. Results indicate that, during prevailing southwesterly airflow, large sulfur influxes are present. These influxes, which are at the same order of magnitude as the Tennessee Valley regional emission fluxes, can only partly be explained by upwind anthropogenic sources. Natural source emissions are hypothesized to account for about half of this sulfur.

PB81-147803 PC **A03**/MF **A01**
Nebraska Water Resources Center, Lincoln.
Water Resources Research Coordination and Planning in the Missouri River Basin.
Completion rept.
Mar 78, 39p W81-01003, OWRT-B-038-NEB(1)
Contract DI-14-34-0001-7203
Prepared in cooperation with Missouri River Basin Region Water Resources Research Centers/Institutes.

The main objective in this project was to identify and categorize water problems. The Missouri River

Basin Water Institute Consortium (MRBWIC) selected a particular problem to receive most of its attention. This was the problem of the allocation of the diminishing groundwater supplies in the Basin. Research needs to make sound decisions on water allocations were developed and the cost of this research estimated.

PB81-147829 PC **A03**/MF **A01**
Caribbean Research Inst., St. Thomas, VI. Water Resources Research Center.
Water Usage Patterns in the U.S. Virgin Islands.
Completion rept.,
Donald C. Bullock, Roger W. Peebles, and Henry H. Smith. Aug 80, 33p TR-6, W81-01005, OWRT-A-011-VI(1)
Contract DI-14-34-0001-9050

This study was conducted to develop an original data set on the water use pattern for dwelling units occupied by residents and tourists, and to analyze the data to provide per capita demand figures for residential water use because of increasing water supply costs. Thirteen dwelling units were selected and monitored by the installation of a novel clock-pressure switch water measurement system for a monitoring project that covered 1790 dwelling unit days involving 5900 people days, from November 1979 to July 1980. The major conclusion of the study was that high standards of living can be maintained in the U.S. Virgin Islands with an average domestic water usage of less than 40 and perhaps as low as 30 gallons per person per day.

PB81-148132 PC **A03**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Pilot-Scale Studies on the Composition and Characteristics of Urban Refuse.
Rept. of investigations/1980,
R. S. DeCesare, F. J. Palumbo, and P. M. Sullivan. 1980, 39p BUMINES-RI-8429

Operation of the Bureau of Mines raw refuse continuous separation pilot plant is described, including modifications made to plant equipment for improved performance. Products recovered from refuse, many of which have been evaluated by other laboratories and private firms, are discussed. Sampling procedures used in the pilot plant and detailed data obtained from processing refuse from 13 municipalities are presented in appendixes. Fuel evaluations made on combustible fractions of refuse from the various municipalities are also presented.

PB81-148231 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Controlled Burnout of Wasted Coal on Abandoned Coal Mine Lands.
Rept. of investigations/1980,
Robert F. Chaiken. 1980, 29p BUMINES-RI-8478

A novel approach to eliminating environmental and public safety hazards that are associated with fires in abandoned coal mines and waste banks involves the use of in situ combustion technology developed by the Federal Bureau of Mines to accelerate the burning of the wasted coals in place. This technology would be used under exhaust ventilation control conditions that would allow for total management of the hot gases produced. Combustion stoichiometries would be optimized to minimize unburnt combustibles and to maximize the heat content of the gas products, which will be exhausted at one or more fan locations. When necessary, scrubber systems would be employed to remove air pollutants, such as sulfur dioxide; heat utilization systems (process heat, steam, and electricity) would also be employed to offset operational costs. Ultimately, complete burnout would solve the fire and acid water formation problems of the abandoned coal mine or waste bank. Pertinent technical data for burnout control are derived and discussed in terms of the important material and operational parameters.

PB81-148736 PC **A02**/MF **A01**
Municipal Environmental Research Lab., Cincinnati, OH.
Small Water Systems: Role of Technology.
Journal article,
Robert M. Clark. 26 Mar 79, 18p EPA-600/J-80-207
Pub. in Jnl. of the Environmental Engineering Division, American Society of Civil Engineers, v106 nEE1 p19-35 Feb 80.

Over 90% of the nation's water supplies serve fewer than 10,000 people, less than 25% of the total population. Many of these small systems have problems. One of the major problems is their lack of operating revenues. They cannot benefit from economies of scale as do large urban systems because they are small in terms of the number of connections served. These technological systems include package treatment plants and reverse osmosis plants. Management systems include cost accounting systems.

PB81-150195 PC **A03**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
Five-Year Water Resources Research and Development Plan, Fiscal Years 1982-1986.
Dec 80, 49p W81-01160

This report has described the current condition of New Jersey's water resources, has identified priority State issues likely to be of major concern during the next five years, and has proposed a research agenda to address priority problems.

PB81-150203 PC **A06**/MF **A01**
Wisconsin Univ.-Madison. Water Resources Center.
Water Problems and Research Needs for Wisconsin, a 5-Year Plan.
Sep 80, 106p W81-01159

This report provides an overview of available information on Wisconsin's water resources, shorelands, and water use, and includes a summary of State management and planning activities.

PB81-150211 PC **A04**/MF **A01**
Ohio State Univ., Columbus. Water Resources Center.
Five-Year Water Resources Research and Development Plan Fiscal Years 1982-1986,
Robert L. Vertrees, and Robert C. Stiefel. Oct 80, 66p W81-01164
Color illustrations reproduced in black and white.

Adequate water is available from precipitation, the Ohio River and Lake Erie to meet Ohio's immediate needs. Most of Ohio's water-related problems are associated with water quality. Large quantities of waste products are produced from point/diffuse sources, developing concerns in surface runoff from urban, agricultural and mining areas over the State. The potential contamination of groundwaters by toxic/hazardous wastes represents a critical water resources problem.

PB81-150260 PC **A05**/MF **A01**
Delaware Univ., Newark. Water Resources Center.
Planning for Fiscal Years 1982/1986.
Nov 80, 92p W81-01163

This five-year report covered State geological information (aquifers, surface water, climate, land use), water quality and use, governmental and other agencies and their anticipated fiscal year 1981 activities, Delaware's water problem categories, and has identified research priorities.

PB81-150385 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Review of Published Research into the Formation of Corrugations on Unpaved Roads,
W. Heath, and R. Robinson. c1980, 25p TRRL-SUPPLEMENTARY-610
Also pub. as ISSN-0305-1315.

The report reviews published information on the problem of the formation of corrugations on unsurfaced roads. Early theories, which were reviewed by the Laboratory in 1958, are contrasted with more recent work. There is now wide acceptance for the theory that corrugations are formed by forced oscillations at the resonant frequency of vehicles' suspension and tyre systems. There is, however, no clear understanding of why certain road materials corrugate while others do not. (Copyright (c) Crown Copyright 1980.)

PB81-150583 PC **A16**/MF **A01**
Touhill, Shuckrow and Associates, Inc., Pittsburgh, PA.
Concentration Technologies for Hazardous Aqueous Waste Treatment.
Interim rept.,
Alan J. Shuckrow, Andrew P. Pajak, and Jerome W. Osheka. Feb 81, 358p EPA-600/2-81-019
Contract EPA-68-03-2766

A stepwise evaluation of the potential applicability of the candidate technologies to the identified contamination problems was carried out. Technology profiles describing the pertinent processes and current applications were prepared. These profiles formed the basis for the initial screening of the applicability of individual technologies to concentration of hazardous constituents of aqueous wastes. Certain technologies were eliminated from further consideration for reasons discussed in the individual technology profiles. Remaining technologies were carried forward for more detailed review. Compounds identified in the waste streams fell into one of thirteen chemical classes: alcohol, aliphatic, amine, aromatic, halocarbon, metal, miscellaneous, PCB, pesticide, phenol, phthalate, or polynuclear aromatic. The next step in the evaluation process was an extensive literature review which focused on the technologies and upon chemical compounds classes. It was concluded that six processes: biological treatment, chemical coagulation, carbon adsorption, resin adsorption, membrane processes, and stripping have the greatest potential broad range and immediate applicability. In most cases, no single unit process would be sufficient in itself to adequately treat the diverse contamination problems likely to be encountered. Five candidate process trains were formulated as being most broadly applicable to the types of known contamination. A desktop analysis then was performed to assess the ability of each process train to treat each of three selected contamination problems.

PB81-150591 PC **A99**/MF **A01**
Applied Technology Council, Palo Alto, CA.
Earthquake Resistance of Highway Bridges, Proceedings of a Workshop Held at San Diego, California on January 29, 30 and 31, 1979,
Ronald L. Mayes, and Roland L. Sharpe. Nov 79, 621p NSF/RA-790387
Grant NSF-PFR78-11802

This workshop was held to summarize the current state of knowledge and to establish research needs on seismic aspects of highway bridge design. Main objects included the following: (1) to evaluate current knowledge and practice in the planning, design, and construction of earthquake-resistant bridges; (2) to examine needs and priorities for immediate and long-range research required to minimize gaps in current knowledge and improve current practice; and (3) to improve communication and cooperation between research and professional organizations as well as among different research groups. Forty-seven specialists from professional and research disciplines participated in workshop activities. Recommendations formulated during the workshop included the need for greater cooperation and communication between researcher and professionals, evaluation and dissemination of available data and pertinent design-oriented technical information, an on-going program motion research to review and upgrade seismological and geological bases of design, a program of integrated and experimental research on the three-dimensional linear elastic and hysteric behavior of real bridges under seismic loading conditions, and the development of procedures to determine the seismic loading conditions, and the development of procedures to determine the seismic resistance and acceptable damage loads of existing bridges. Appendices list program participants, members of working groups, and research publications.

PB81-150617 PC **A06**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Impact of the Resource Conservation and Recovery Act on FBC Residue Disposal.
Final rept. May 79-May 80,
C. C. Sun, R. A. Newby, and D. L. Keairns. Feb 81, 103p EPA-600/7-81-011
Contract EPA-68-02-3110

The report gives results of an assessment of the Resource Conservation and Recovery Act (RCRA) of 1976 and its current regulations with respect to both fluidized-bed combustion (FBC) residue disposal and, of special importance, the proposed Sec. 3001 regulations for hazardous waste identification.

PB81-150690 PC **A08**/MF **A01**
Joint German-Netherlands Research Project.
Cooperation Between the Netherlands and the Federal Republic of Germany on Air Pollution Problems.
1978, 168p

Next year German-Netherlandish co-operation in the field of environmental protection will have a history of ten years' successful activity. Thus, scientists and practical experts of both countries came together to find solutions for problems of air and water pollution affecting both countries. Growing knowledge of the effects of pollutants which are transported through the air over considerable distances and which may be harmful to the environment led to the idea of a joint research project concerning this very subject. The problem to be investigated was the interregional transport of air pollutants and, more specifically, the paths and fate of pollutants emitted into the air in the region of Germany/Netherlands. This document contents: Summary of the expert meetings; Emission inventories for use in interregional air quality modelling; Development and application of a statistical model; Development and application of a deterministic model; Summary of the modelling experience and the climatological results from the project; Meteorological aspects of interregional transport; Findings from meteorological measurements; Mesoscale transport of air pollutants aircraft measurements; Interregional transport of air pollutants: Evaluation of Dutch measurement results; Plume profiles and air pollution transport--Airplane measurements in the period July 1976-December 1977.

PB81-150856 PC **A10**/MF **A01**
Environmental Protection Service, Jerusalem (Israel).
The Environment in Israel,
Lucy Turpin. 1979, 203p EPS/PUB-79-01

Contents: Policy bodies concerned with the environment; Land use planning; Resources, pollutants and impacts; The legislative framework for protecting the environment; Environmental education; International affairs.

PB81-150914 PC **A03**/MF **A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Policy Options for the Transportation-Air Quality Process.
Interim rept.,
Elizabeth Deakin, Greig Harvey, and David Calkins. Sep 80, 33p AQ-7919-16A
Contract 16-AQ-7912

This report describes the various policy options for future transportation and air quality program integration. The options are derived from previous work performed as part of this study (literature reviews; discussions with government, environmental, business, academic, and transportation research experts; and case studies in Milwaukee, Dallas-Fort Worth, and the San Francisco Bay Area). The sections of the Clean Air Act (CAA) addressed include those dealing with transportation planning and funding (Sec. 174 and 175) and Title I, Part D requirements for nonattainment areas.

PB81-150930 PC **A03**/MF **A01**
Sydney Univ. (Australia). Civil Engineering Labs.
A Theoretical Study of Pile/Rock Socket Behaviour.
Research rept.,
R. K. Rowe, and P. J. N. Pells. Jul 80, 47p R-368

The behavior of piles socketed into a homogenous rock mass is studied using a finite element technique. A pointwise strain-softening model of the interface behaviour is adopted. This model corresponds to the situation where there is a break in the cement bond between the concrete and rock once the peak shear strength is reached at that point. Consideration is given to the influence of socket geometry, the relative stiffness of the pile and rock, the angle of friction at the interface, the initial horizontal stresses at the interface prior to loading, and the roughness of the socket. It is shown that under certain combinations of these fundamental parameters, a brittle response of the pile may be anticipated. Other combinations of these parameters are shown to give rise to a simple plastic or even plastic workhardening response of the pile even though the interface behaviour is pointwise strain-softening. The results of a simplified analysis are presented in a chart form which may be used in the design of socketed piles. These charts provide an estimate of the pile head settlement, the load transfer to the pile base and the shear mobilization along the socket for a given pile load.

PB81-150955 PC **A05**/MF **A01**
Environmental Research Lab.-Duluth, Grosse Ile, MI. Large Lakes Research Station.
Responses of Saginaw Bay, Lake Huron, to Reductions in Phosphorus Loadings from the Saginaw River,
Victor J. Bierman, Jr., and David M. Dolan. Dec 80, 87p EPA-600/3-80-099

Results of phosphorus load reductions are presented for parameters that relate most directly to the water quality issues in Saginaw Bay. These parameters include taste and odor in the municipal water supply, and annual average total phosphorus concentration. Results are also presented for total phytoplankton biomass and total blue-green phytoplankton biomass.

PB81-151003 PC **A11**/MF **A01**
Federal Highway Administration, Washington, DC. Office of Traffic Operations.
Evaluation of Traffic Operations, Safety and Positive Guidance Projects. Volume II in a Series on Positive Guidance,
Harold Lunenfeld. Oct 80, 227p FHWA/TO-80-1

The report is for use by highway and traffic engineers and technicians in implementing an evaluation of Traffic Operations, Safety and Positive Guidance projects. Evaluation should begin in the planning stage where evaluation designs are selected and measures of effectiveness (MOE's) identified. It should continue during the solution development phase where the measures are used as diagonostics and culminate in an evaluation where differences are in the measures taken before and after the improvement are used to asses the effectiveness of the solution. The Evaluation report provides a cookbook approach to implementing the procedure. This enables those engineers and technicians who are not versed in accident or accident surrogate MOE's, experimental design or statistical analysis to determine whether their solution is effective. Each step in the evaluation is structured in terms of inputs, outputs, and the logic involved in its execution. Tables and worksheets lead to the development of a detailed evaluation plan, data collection procedure and data analysis routine. Among the factors detailed are the selection of appropriate MOE's, overcoming threats to the validity of the evaluation, ways to assure Before and After comparability, how to select the proper statistical test, establishing an appropriate confidence level and recognizing the importance of practical significance.

PB81-151359 PC **A04**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Pipeline Transportation Safety R and D Working Group Meeting, Proceedings Held at Cambridge, Massachusetts on June 30-July 1, 1980.
Interim rept.,
H. C. Ingrao, R. H. Heidersbach, and R. K. Sharp. 30 Jul 80, 70p DOT-TSC-RSPA-80-22

A Pipeline Transportation Safety R&D Working Group Meeting took place at the DOT Transportation Systems Center on June 30 - July 1, 1980. The objective of this meeting was to reach concensus on future pipeline transportation safety issues and possible solutions requiring specific and timely R&D. The meeting was attended by representatives from industry, associations, research institutes, universities and government agencies associated with pipeline transportation safety. The meeting resulted in the identification of future concerns in the areas of: pipeline system analysis methodology, pipeline inspection and maintenance, and pipeline design and construction. The conclusions of the workshop will be a source for formulating the Pipeline Transportation Safety R&D Plan of the DOT Transportation Programs Bureau.

PB81-151433 PC **A13**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Benzene Emissions from Benzene Storage Tanks - Background Information for Proposed Standards.
Draft environmental impact statement.
Dec 80, 277p EPA-450/3-80-034A

Standards of Performance for the control of emissions from benzene storage tanks are being proposed under the authority of Section 112 of the Clean Air Act. These standards would apply to all new and existing storage tanks having a capacity of 4 cubic meters or larger, which are to be used for the storage of pure benzene. Existing sources will have to comply with the standard within 90 days of its effective date, unless a waiver of compliance is secured from the Administrator. This document contains background information and environmental and economic impact assessments of the regulatory alternatives considered in developing the proposed standards.

PB81-151490 PC **A06**/MF **A01**
Cooper Union Research Foundation, Brooklyn, NY.
Correlation of Mathematical Models for Water Temperature with Aerial Infrared Water Temperature Surveys and Investigation of Thermal Fronts.
Final rept. Jun 78-Aug 79,
J. C. Cataldo, and A. S. Goodman. Aug 79, 115p NYSERDA-79-9
Prepared in cooperation with Polytechnic Inst. of New York, Brooklyn, and Rochester Gas and Electric Corp., NY.

Thermal plumes are created when power plants discharge heated water. Two mathematical models were developed in earlier phases of this project to predict the behavior and activity of these plumes. The first model employs surface temperature data from infrared pictures of a thermal plume. Based on this data the model can be used to determine the three-dimensional configuration of a thermal plume. Predicted configurations were found to be extremely accurate when compared to actual field data.

PB81-151623 PC **A04**/MF **A01**
Louisiana Dept. of Transportation and Development, Baton Rouge. Research and Development Section.
Design and Evaluation of High Strength Concrete for Girders.
Final rept. Feb 79-Jun 80,
Sheldon M. Law, and Maasood Rasoulian. May 80, 59p RR-138, LA-79-2C(B), FHWA/LA-80/138

High strength concrete was required for the construction of the new design prestressed girders on the elevated portion of the Westbank Expressway. This study project was initiated to determine if the required strength could be obtained in a production mode. Scope of this project included laboratory mixing, testing and field evaluation. The prime conclusion reached on this study was that high strength concrete (minimum compressive strength 6500 psi) can be obtained. The results of this study indicated that both limestone (ASTM no. 7 gradation) and regular Class A concrete produced the necessary strength, however, limestone is considered to be the best material to achieve high strength. A set of changes in the Class P(M) specifications in the form of special provisions to the construction project were written to be used by the consulting engineers for their presentation to the Department for their review and approval.

PB81-151664 PC **A13**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

Benzene Fugitive Emissions - Background Information for Proposed Standards.
Draft environmental impact statement.
Nov 80, 292p EPA-450/3-80-032A

A national emission standard for petroleum refining and organic chemical manufacturing industries is being proposed under authority of Section 112 of the Clean Air Act (42 U.S.C. 7412, as amended). The purpose of the proposed standard is to minimize benzene fugitive emissions in these industries. The document provides background information for the proposed standard. Control technologies and five regulatory alternatives are evaluated in terms of environmental and economic impacts on both new and existing emission sources. Included in the evaluation of environmental impacts are estimates of air quality, water, noise, and solid waste impacts. Included in the evaluation of economic impacts are estimates of total capital and annualized costs, including recovery credits.

PB81-152043 PC **A21**/MF **A01**
Radian Corp., Austin, TX.
Interagency Flue Gas Desulfurization Evaluation.
Final rept. May-Dec 77,
J. C. Dickerman, D. H. Brown, and W. R. Menzies. Feb 81, 488p RAD-80-202-187-16-31, EPA-600/7-81-015
Contract EPA-68-02-2608

The report gives results of a 6-month study of flue gas desulfurization (FGD) technology conducted by an interagency team in 1977. The study was mandated by President Carter in his April 1977 National Energy Plan. The purpose of the study was to determine whether additional Federal funding would accelerate the commercialization and acceptance of FGD technology. The report concludes that FGD is the most viable short-term approach to meeting increased coal-use objectives of the National Energy Plan, and it identifies specific FGD research, development, and demonstration priorities. The report also presents a background of FGD technology (as of 1977) and the methodology used in the study to select the most promising FGD processes and subsystems. The appendices give detailed technical data on specific FGD technology.

PB81-152050 PC **A03**/MF **A01**
Thomas, Dean and Hoskins, Inc., Great Falls, MT.
Particle Size Variation Effects on Landfilled Solid Waste: Cold Climate Studies.
Final rept. Jul 78-Jul 80,
L. David Heckler. Feb 81, 44p EPA-600/2-81-018
Grant EPA-R-805012

Four experimental test plots were constructed using four different particle size distributions. Each pit containing a specified milled refuse particle size was evaluated in an attempt to correlate particle size with different parameters. The parameters under study were: wind displacement of milled refuse; differential settlement of compacted milled refuse; and attraction of vectors, rodents, birds and wildlife to the milled refuse.

PB81-152167 PC **A11**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
VOC Fugitive Emissions in Synthetic Organic Chemicals Manufacturing Industry - Background Information for Proposed Standards.
Draft environmental impact statement.
Nov 80, 245p EPA-450/3-80-033A

Standards of performance to control fugitive emissions of VOC from new, modified, and reconstructed Synthetic Organic Chemical Manufacturing Industry (SOCMI) plants are being proposed under Section III of the Clean Air Act. This document contains information on SOCMI, emission control technology for fugitive emissions of VOC, Regulatory Alternatives which were considered, analyses of environmental, energy, costs, and other technical data to support the standard of performance.

PB81-152399 PC **A99**/MF **A01**
Soil Conservation Service, Washington, DC. Engineering Div.
Watershed and Stream Mechanics.
Final rept.
Mar 80, 856p

This reference material contains 'class notes' for a training course on stream mechanics. The training course provides an awareness and understanding of the basic principles of watershed and river hydraulics and the dynamic boundary response. This reference presents principles of stream dynamics of both rigid boundary and alluvial (movable bed) channels, and quantitative procedures for analysis of channel modification, etc. It reviews the dynamics of stream systems considering geologic, hydrologic, and hydraulics perspectives.

PB81-152548 PC **A13**/MF **A01**
Los Angeles-Orange County Metropolitan Area Project, Whittier, CA.
Sludge Processing and Disposal, a State-of-the-Art Review.
Final rept.,
Roger T. Haug, Liberato D. Tortorici, and Sagar K. Raksit. Apr 77, 290p
Grant EPA-C-06-1042-010
See also PB81-152555.

Available information on existing and potential sludge processing, transportation, and disposal systems is compiled. Sludge treatment systems are discussed according to basic components and components are organized according to subject matter. Desired components can be assembled into a treatment train to effect desired processing and disposal goals.

PB81-152555 PC **A05**/MF **A01**
Los Angeles-Orange County Metropolitan Area Project, Whittier, CA.
Sludge Management Alternatives for the Los Angeles/Orange County Metropolitan Area.
Final rept.
May 77, 77p
Grant EPA-C-06-1042-010
See also PB81-152548.

Results of analysis of candidate systems for sludge management are summarized. Least attractive candidate systems are identified and deferred from further study. Fundamental sludge management alternatives are described and changes in the LA/OMA Project workplan are defined.

PB81-152571 PC **A02**/MF **A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Critical Factors in the Implementation of Transportation Measures.
Interim rept.,
E. Deakin, and G. Harvey. Aug 80, 24p AQ-7912-16B
Contract 16b-AQ-7912

The memorandum presents preliminary findings on the transportation-air quality planning process which has emerged in response to the 1977 Clean Air Act Amendments and earlier legislation. The findings are based on interviews with local, regional, state and federal officials, with experts in transportation and urban policy, and with representatives of the business community, environmental groups, and other public and private organizations. Milwaukee, Dallas-Ft. Worth, and the San Francisco Bay Area are the primary cases; but the experiences of several other urban areas also are reflected in the findings.

PB81-152621 PC **A03**/MF **A01**
Geological Survey, Rolla, MO. Water Resources Div.
Effects of the Proposed Prosperity Reservoir on Ground Water and Water Quality in Lower Center Creek Basin, Missouri.
Water-resources investigations (Final),
Wayne R. Berkas, and James H. Barks. Nov 80, 36p USGS/WRD/WRI-81/006, USGS/WRI-80-88
Prepared in cooperation with Corps of Engineers.

Effects of the proposed Prosperity Reservoir on ground water and water quality in lower Center Creek basin depend partly on the effectiveness of Grove Creek as a hydrologic boundary between the reservoir site and the Oronogo-Duenweg mining belt. Results of two dye traces indicate that Grove Creek probably is not an effective boundary. Therefore, higher water levels near the reservoir could cause more ground water to move into the mining belt and cause a greater discharge of zinc-laden mine water into Center Creek.

PB81-153124 PC **A16**/MF **A01**
Los Angeles-Orange County Metropolitan Area Project, Whittier, CA.
Initial Analysis of Candidate Systems and Preliminary Site Identification.
Final rept.
Apr 77, 364p
Grant EPA-C-06-1042-010
Prepared in cooperation with CH2M Hill, Newport Beach, CA. Sponsored in part by Los Angeles County Sanitation Districts, Whittier, CA., Orange County Sanitation Districts, CA., Los Angeles, CA., and California State Water Resources Control Board, Sacramento.Color illustrations reproduced in black and white.

Seventeen candidate sludge management systems, each consisting of processing, transportation and disposal facilities, have been analyzed and compared to identify those systems for potential use in the Los Angeles/Orange County Metropolitan Area of California. Construction costs, operation and maintenance costs, energy and land requirements, and air pollutant emission rates are determined. Cost curves are provided. Qualitative factors consisting of selected environmental concerns, implementability, public health effects, reliability, flexibility, land use, social concerns, and legislative requirements are also examined. Specific sludge disposal and reuse sites are identified and assessed with respect to soil and hydrologic suitability, land acquisition, selected social and environmental aspects, compatibility with land use and water quality plans, and implementability.

PB81-153132 PC **A04**/MF **A01**
Los Angeles-Orange County Metropolitan Area Project, Whittier, CA.
Final Facilities Plan/Program and Summary of Final EIS/EIR, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area.
Final rept.
Oct 80, 58p
Grant EPA-C-06-1042-010
Sponsored in part by California State Water Resources Board, Sacramento, Los Angeles, CA., Los Angeles County Sanitation Districts, Whittier, CA., and Orange County Sanitation Districts, CA.

A proposed program has been selected to serve the sludge management needs of the City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts. The proposed program provides for complete cessation of ocean discharge of sludge and recovery of useable resources from the sludge. For the City of Los Angeles, a system of dehydration and thermal processing for volume reduction and energy recovery has been selected. For the Los Angeles County Sanitation Districts, a combination of dehydration and thermal processing for volume reduction and energy recovery, advanced windrow composting and recycling, and landfill disposal of sludge has been selected. Truck transport of dewatered sludge to an offsite location for composting/air drying has been selected for the Orange County Sanitation Districts.

PB81-153264 PC **A17**/MF **A01**
Kinetic Research, Goleta, CA.
Fatal Accident Reporting System (FARS) Data Enhancement.
Final rept. Sep 78-Aug 79,
P. Dougan, L. A. Klimko, and B. Schmitz. Aug 80, 393p KR-TR-069, DOT-HS-805 666
Contract DOT-HS-8-02025

The quality of data in the 1978 Fatal Accident Reporting System data file was evaluated. Errors in the FARS data can affect statistical inferences of researchers and, more importantly, can affect NHTSA's policy decisions. Procedures for assessing the extent of error arising from interpretation of source documents and application of coding definitions by FARS analysts were developed; procedures for assessing the extent of transcription error in submitted cases and for estimating missing data in the FARS file were also developed.

PB81-153660 PC **A03**/MF **A01**
Florida State Dept. of Transportation, Gainesville. Office of Materials and Research.
Evaluation of Penetrants and Coatings Used on Reinforced Concrete Surfaces.
Final rept.,
R. P. Brown, and R. J. Kessler. Aug 79, 50p RR-207, FHWA/FL-79-207

This report presents a method by which the performance of protective coatings for reinforced concrete in a marine environment can be evaluated. Comparison of properties resulting from an impressed current test is used to establish acceptance limits for qualification of protective coatings to be used on structural concrete in a corrosive environment.

PB81-153728 PC **A12**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section III (Part I). Determination of Internal Forces in the Pipe and Pipe Deformations, R/C Pipe.
Interim rept.,
R. E. Davis, and D. W. Spannagel. Nov 79, 252p 624175, FHWA/CA/SD-79/14
See also Section 4, Volume 1, PB80-166416.

Strains read from SR-4, electrical resistance gauges and Carlson strainmeters placed at the octant points of the Cross Canyon culverts, were used to determine bending moments and thrusts in the pipe walls. Small steel spheres were affixed to the inner pipe walls at the octant points to permit determination of displacement fields. Methods of analysis are presented in this section of the report. Also included are plots of wall moments and thrusts as functions of overfill and time after fill completion. Moment, thrust and displacement fields for given overfills determined thusly are compared with quasi-theoretical fields in Section V. Part 1 of this section is concerned only with the dummy culvert. Similar material pertinent to the prestressed pipe will be discussed in Section III, Part 2.

PB81-153884 PC **A05**/MF **A01**
Arkansas Univ., Fayetteville. Dept. of Civil Engineering.
Construction Procedures Using Self Hardening Fly Ash.
Final rept. on Highway Research Project no. 52,
Sam I. Thornton, and David G. Parker. Jul 80, 95p FHWA/AR-80/004
Sponsored in part by Arkansas State Highway and Transportation Dept., Little Rock.

Fly ash produced in Arkansas from burning Wyoming low sulfur coal is self-hardening and can be effective as a soil stabilizing agent for clays and sands. The strength of soil-self hardening fly ash develops rapidly when compacted immediately after mixing. Seven day unconfined compressive strengths up to 1800 psi were obtained from 20% fly ash and 80% sand mixtures. A time delay between mixing the fly ash with the soil and compaction of the mixture reduced the strength. With two hours delay, over a third of the strength was lost and with four hours delay, the loss was over half. Gypsum and some commercial concrete retarders were effective in reducing the detrimental effect of delayed compaction. Adequate mixing of the soil and fly ash and rapid compaction of the mixtures were found to be important parameters in field construction of stabilized bases.

PB81-154320 PC **A03**/MF **A01**
Science Applications, Inc., East Brunswick, NJ.
Field Testing to Determine the Presence or Absence of Sulfur Dioxide Emissions from Old In situ Oil Shale Field-Sites.
Dec 80, 28p EPA-600/7-80-182
Sponsored in part by Department of Energy, Laramie, WY. Laramie Energy Technology Center.

One of the major technology needs in the development of the oil shale industry is to adopt and develop methods for controlling the release of pollutants to the environment. Large quantities of sulfur dioxide may be generated from oil shale retorting operations. Sulfur dioxide is a pollutant when released to the atmosphere and must be controlled when concentrations exceed legal standards. This project was a brief field testing effort to determine if sulfur dioxide emissions were being released from old (in situ) oil shale sites.

PB81-154635 PC **A07**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Verkehrspolitische Grundsatzabteilung.
Mitteilungen ueber Forschungen zur Verbesserung der Verkehrsverhaeltnisse der Gemeinden. Erweiterte Kurzfassung des Forschungsberichts: Entwicklung eines Konzepts fuer ein Kuenftiges Bus-Verkehrssystem (Communications on Research Aimed at Improving Transport Conditions in Cities, Towns and Other Built-Up Areas. Extended Abstract of the Study Report: Development of a Concept for a Future Bus Transport System).
Special issue no. 20.
1977, 144p
Text in German and English.

Contents: Part I: Urban transport research program; (A) Classification of research and study assignments; (B) Survey of research projects commissioned since 1967; and Part II: Extended abstract of the study report: Development of a concept for a future bus transport system.

PB81-154643 PC **A10**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Verkehrspolitische Grundsatzabteilung.
Mitteilungen ueber Forschungen zur Verbesserung der Verkehrsverhaeltnisse der Gemeinden. Erweiterte Kurzfassung des Forschungsberichts: Vergleichende Untersuchungen ueber bestehende und kuenftige Nahverkehrstechniken (Communications on Research Aimed at Improving Transport Conditions in Cities, Towns and Other Built-Up Areas. Extended Abstract of the Study Report: Comparative Study of Existing and Future Short-Distance Transport Technologies).
Special issue 12.
Apr 75, 211p
Text in German and English.

Contents: Part I: Urban transport research program; (A) Classification of research and study assignments; (B) Survey of research projects commissioned since 1967; and Part II: Extended abstract of the study report; Comparative study of existing and future short-distance transport technologies.

PB81-154692 PC **A10**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Verkehrspolitische Grundsatzabteilung.
Mitteilungen ueber Forschungen zur Verbesserung der Verkehrsverhaeltnisse der Gemeinden. Untersuchung der Betriebsablaeufe neuer Nahtransportsysteme und verbesserter Schnellbahnen durch Simulation einschliesslich Erarbeitung von Planungs- und Entscheidungsgrundlagen (Communications on Research Aimed at Improving Transport Conditions in Cities, Towns and Other Built-Up Areas. Study of the Operation of New Short-Distance Transport Systems and of Improved High-Speed Railways by Simulation, Including the Establishment of Bases for Planning and Decision-Making).
Special issue no. 25.
1979, 216p
Text in German and English.

Contents: Part I: Summary report (entire project)--Study of the operation of new short-distance transport systems and of improved high-speed railways by simulation, including the establishment of bases for planning and decision-making; and Part II: Urban transport research program--Classification of research and study assignments; and Survey of research projects commissioned since 1967.

PB81-155905 PC **A08**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Environmental Effects of Surface Mining of Minerals Other Than Coal: Annotated Bibliography and Summary Report.
Forest Service general technical rept.,
Bland Z. Richardson, and Marilyn Marshall Pratt. Nov 80, 155p FSGTR/INT-95

This bibliography contains annotated references to literature about the environmental effects of surface mining for minerals other than coal. Each reference is indexed by commodity, general subject, and environmental problem. The publication includes a section of references to unpublished, 'soft' literature and a summary of professional concerns about mining impacts throughout the United States.

PB81-155970 PC **A13**/MF **A01**
Maine State Planning Office, Augusta.
Maine's Coastal Program.
Environmental impact statement (Final).
Aug 78, 290p NOAA-80061111

The Final Environmental Impact Statement for Maine's Coastal Program is presented. While there may be some negative impacts, approval of the proposed program will, in general improve the quality of the natural, social, and economic environment of the Maine Coast. The overall impacts of carrying out the program specified should include: improved water quality, improved management of marine species, and improved management of areas such as wetlands and steep slopes deserving special attention.

PB81-156002 PC **A05**/MF **A01**
Shanafelt (George O.) and Willis B. Horn, Olympia, WA.
Damage Evaluation and Repair Methods for Prestressed Concrete Bridge Members.
Final rept.,
George O. Shanafelt, and William B. Horn. Nov 80, 79p TRB/NCHRP/REP-226, ISBN-0-309-03032-3
Sponsored in part by Federal Highway Administration, Washington, DC., and American Association of State Highway and Transportation Officials, Washington, DC. Library of Congress catalog card no. 80-53763. Also pub. as ISSN-0077-5614. Report on National Cooperative Highway Research Program, Synthesis of Highway Practice.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

This report documents and presents the results of a study of accidental damage to prestressed concrete bridge members. Primary emphasis was placed on accidental damage due to impact by overheight vehicles; however, accidental damage due to fire, during manufacture, and other damages were also studied. Information was gathered from transportation departments, prestressed concrete manufacturers, and a literature search. The types of accidental damage occurring and the severity and frequency of their occurrence are summarized. Present practices and equipment used for assessing damage and making repairs are presented and evaluated. Guidelines for inspection, assessing damage, and selection of repair methods are given. Methods of repair includes adding external prestress, a metal sleeve splice, and splicing broken strands or rods. The finding of this study suggest that in some instances better repair techniques should be used. The findings of this study also indicate that proper selection of repair methods may reduce the number of damaged girders presently being replaced. Plausible methods of repair requiring additional research are identified and techniques for testing are outlined.

PB81-156010 PC **A08**/MF **A01**
Simpson Gumpertz and Heger, Inc., Cambridge, MA.
Plastic Pipe for Subsurface Drainage of Transportation Facilities.
Final rept.,
R. E. Chambers, T. J. McGrath, and F. J. Heger. Oct 80, 163p TRB/NCHRP/REP-225, ISBN-0-309-03030-7
Sponsored in part by Federal Highway Administration, Washington, DC., and American Association of State Highway and Transportation Officials, Washington, DC. Library of Congress catalog card no. 80-53263. Also pub. as ISSN-0077-5614. Report on National Cooperative Highway Research Program, Synthesis of Highway Practice.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

This report documents and presents the results of a study of buried plastic pipe for the drainage of transportation facilities. Design, installation, and performance criteria were developed, analyzed, and evaluated in order to select pipe systems suitable for the application. Ongoing state installations of plastic pipe were monitored to observe installation practice. Full-scale field tests were performed in cooperation with states to obtain realistic data on the effects of installation conditions and on pipe behavior and performance. Several piping systems are appropriate for transportation drainage applications. Perforated corrugated polyethylene (PE) tubing, perforated polyvinyl chloride (PVC), and acrylonitrile butadiene styrene (ABS) pipe are selected for underdrains. PVC pipe and ABS composite pipe are selected for storm drains and small culverts. Advantages and possible limitations are presented. Guide specifications are proposed for corrugated PE tubing and PVC pipe. A proposed recommended practice for installing plastic pipe in transportation drainage applications is also presented.

PB81-156507 PC **A99**/MF **A01**
Florida Univ., Gainesville. Center for Wetlands.
Resource Inventory and Analysis of the Big Cypress National Preserve. Volume I - Natural Resources.
Final rept.,
Michael J. Duever, John E. Carlson, John F. Meeder, Linda C. Duever, and Lance H. Gunderson. Jul 79, 716p NPS/ST-81/01-1
Contract DI-CX5000-7-0899
Prepared in cooperation with National Audubon Society, Inc., Naples, FL. Ecosystem Research Unit. See also Volume 2, PB81-156515.

The Big Cypress National Preserve (BCNP) is a 230,000 ha southwest Florida wetland. This study compiled and analyzed information relevant to BCNP resource management. Volume 1 describes the climate, geology, hydrology, vegetation, animals, and fire history and effects in BCNP. Fire, hydrology, and endangered and exotic species are important management considerations.

PB81-156515 PC **A23**/MF **A01**
Florida Univ., Gainesville. Center for Wetlands.
Resource Inventory and Analysis of the Big Cypress National Preserve. Volume 2 - Land Use.
Final rept.,
Michael J. Duever, John E. Carlson, John F. Meeder, Linda C. Duever, and Lance H. Gunderson. Jul 79, 540p NPS/ST-81/01-2
Contract DI-CX5000-7-0899
Prepared in cooperation with National Audubon Society, Inc., Naples, FL. Ecosystem Research Unit. See also Volume 1, PB81-156507.

The Big Cypress National Preserve (BCNP) is a 230,000 ha southwest Florida wetland. This study compiled and analyzed information relevant to BCNP resource management. Volume 2 describes past and present land uses, management units, research needs, and information sources for BCNP. Farming, logging, and jetport development are past activities, but bee-keeping, trapping, frogging, limerock quarrying and oil extraction continue. Hunting and off-road vehicles are the major recreational uses. Indian rights, law enforcement, and inholding management are of concern. Appendices include complete lists of relevant publications and experts on Big Cypress resources.

PB81-156689 PC **A07**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Water Program Operations.
Aquaculture Systems for Wastewater Treatment: An Engineering Assessment.
Technical rept.
Jun 80, 135p EPA-430/9-80-007, EPA/MCD-68

This publication contains the results of an effort to assess the current status of aquaculture technologies for wastewater treatment. The assessment includes an overview and individual engineering assessments covering various wastewater aquaculture systems involving wetlands processes, aquatic plant processes, and combined aquatic processes.

PB81-159378 PC **A02**
New York Sea Grant Inst., Albany.
The Interactions of Stabilized Scrubber Sludge and Fly Ash with the Marine Environment,
F. J. Roethel, I. W. Duedall, H. B. O'Connors, J. H. Parker, and P. M. J. Woodhead. c1980, 8p
NYSG-RR-80-34, NOAA-80122309
Pub. in Jnl. of Testing and Evaluation (ASTM), v8 n5 p250-254 Sep 80.

Scrubber filter cake (sludge) and fly ash have been stabilized into blocks. These blocks have been submerged in an estuarine environment on the north shore of Long Island, N.Y. for nearly two years and have maintained their structural integrity. The blocks were colonized by a diverse aquatic community of marine plants and animals. The uptake of trace metals from the coal waste blocks by the marine organisms was not greater than that found on concrete reference blocks placed nearby. (Copyright (c) 1980 by the American Society for Testing and Materials.)

PB81-169799 PC **A07**/MF **A01**
Dartmouth Coll., Hanover, NH. Dept. of Economics.
Zoning and Suburban Housing Costs: The Effects of Legal Rights and Government Structure,
William A. Fischel. Jun 79, 127p HUD-0001709

This report examines the causes and consequences of 'excessive' land use controls, particularly with respect to suburban housing. To demonstrate that local land use controls, especially in the suburbs, are too restrictive, three new approaches to the land use problem are used. First, a simple theoretical property rights model of zoning issues is outlined, which enables the examination of possible causes of excessive zoning restrictions. The model reveals that monopoly is but one of four possible reasons for the phenomenon of high housing prices coupled with low production. The second approach to the issue is made from an institutional point of view. By examining the operation of zoning and its legal limitations, the attempt is made to show in what direction and to what extent zoning restrictions may be excessive. The evidence thus gained indicates that the institutional structure of zoning has made it at least plausible that the nonmonopoly theories of zoning do have an effect. The strongest indicator of this conclusion is the inability of communities to exchange zoning controls for other types of benefits. The third approach investigates the monopoly motive empirically. The monopoly hypothesis requires a chain of causation with a concentrated structure enabling those who stand to gain from higher prices to alter their conduct so that the performance of the industry is different from the competitive ideal. This hypothesis is challenged at each link in this structure - conduct - performance chain by the institutional analysis. It is argued that relatively few metropolitan areas in the U.S. have a structure of local government which would permit monopoly gains. Nor do the political and institutional constraints on the behavior of local governments allow for monopoly conduct. Finally, the performance of two metropolitan areas with suburban monopoly structures is compared to that of several areas with highly competitive structures, revealing no obvious differences in housing prices according to government structure. Because evidence does not show that monopoly structure leads to excessive land use controls, it is deemed inadvisable to adopt municipal antitrust policies. Instead, a policy is recommended based on 'reasonable' federally established zoning standards to be met by local communities as a condition for receiving Federal funds. Tabular and graphic data are supplied; a bibliography of about 50 entries is provided.

PB81-802969 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Water Separators. 1973-September, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1973-Sep 80.
Jan 81, 172p
Supersedes PB80-801954, and NTIS/PS-78/1258.

Citations cover research on these devices primarily for oil pollution control. Equipment studied includes coalescers, filters, skimmers, scrubbers, absorbers, centrifuges, and sweeps. Oil recovery from oil spills, separation from bilge and ballast water, and removal from petroleum refinery effluents are described. The operation, testing, and performance of this equipment in the laboratory and in the field are reported. (This updated bibliography contains 166 citations, 8 of which are new entries to the previous edition.)

PB81-803090 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Expansion Joints. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 105p
Supersedes PB80-803257, and NTIS/PS-78/1304.

Expansion joints relative to such widely diversified applications as highways and spacecraft are reviewed. Primarily, highway and bridge joints are investigated, but includes uses relevant to ships, pipes, buildings, railroad tracks, underwater structures, and space application. (This updated bibliography contains 101 citations, 4 of which are new entries to the previous edition.)

PB81-803322 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Pollution Effects on Materials. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 258p
Supersedes PB80-801863, and NTIS/PS-78/1073.

The bibliography contains selected research reports on corrosion and damage by air pollution and includes studies on the effects upon steel, textiles, and building materials. Many studies cover a specific pollutant and its corrosive or damaging properties. (This updated bibliography contains 155 citations, 4 of which are new entries to the previous edition.)

PB81-803330 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Pollution Effects on Materials. 1971-September, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1971-Sep 80.
Jan 81, 87p
Supersedes PB80-801871.

The bibliography contains selected research reports from worldwide literature on corrosion and damage by air pollution and includes studies on the effects upon steel, textiles, and building materials. Many studies cover a specific pollutant and its corrosive or damaging properties. This updated bibliography contains 91 citations, 4 of which are new entries to the previous edition.)

PB81-803538 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Filtration. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78.
Feb 81, 241p

This bibliography contains citations relative to studies on centrifugal filtration, trickling filters, sand filters, microstrainers, and vacuum filters. Costs and performance evaluation as related to filtration are included. (This updated bibliography contains 234 citations, none of which are new entries to the previous edition.)

PB81-803546 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Filtration. 1977-1978 (Citations from the Engineering Index Data Base).
Rept. for 1977-78.
Feb 81, 173p

This bibliography discusses worldwide journal literature, on sewage filtration. Studies include trickling filters, sand filters, centrifugal filters, and vacuum filters. Additives, flocculation, nitrogen,

phosphorus, BOD, and biological processes in filtration are also covered. (This updated bibliography contains 166 citations, none of which are new entries to the previous edition.)

PB81-803553 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Filtration. 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1979-Jan 81.
Feb 81, 90p
Supersedes PB80-803703, and NTIS/PS-78/1323.

Citations of Federally-funded research are presented relative to studies on centrifugal filtration, trickling filters, sand filters, microstrainers, and vacuum filters. Costs and performance evaluation as related to filtration are included. (This updated bibliography contains 83 citations, 37 of which are new entries to the previous edition.)

PB81-803561 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Filtration. 1979-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1979-Jan 81.
Feb 81, 76p
Supersedes PB80-803711, and NTIS/PS-78/1324. See also 1973-1975, NTIS/PS-76/0890.

Reports on sewage filtration from worldwide journal literature are cited in this bibliography. Studies include trickling filterers, sand filters, centrifugal filters, and vacuum filters. Additives, flocculation, nitrogen, phosphorus, BOD, and biological processes in filtration are also covered. (This updated bibliography contains 69 citations, 43 of which are new entries to the previous edition.)

PB81-803595 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Urban Automated Traffic Control. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 232p
Supersedes PB80-803174, and NTIS/PS-78/0542.

The control of urban vehicular traffic movement by means of automatic synchronization of intersection and lane signals is covered. Studies on sensing and telemetry devices, computer programming, models, systems development route guidance systems and bus priority systems are included. (This updated bibliography contains 225 citations, 15 of which are new entries to the previous edition.)

PB81-803603 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dredging: Environmental and Biological Effects. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 195p
Supersedes PB80-803331, and NTIS/PS-78/1292.

Worldwide research on dredging related to biology, nutrient composition, sedimentation, and water pollution is cited. Studies include dredging of harbors, estuaries, waterways, and for mineral recovery. The effects of the disposal of dredge spoil in containment areas, landfills, or oceans are cited, as is dredge spoil reuse in land reclamation. (This updated bibliography contains 188 citations, 14 of which are new entries to the previous edition.)

PB81-803611 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dredging: Environmental Aspects. 1977-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1977-Jan 81.
Feb 81, 202p
Supersedes PB80-803323, and Updates NTIS/PS-78/1291.

Citations of Federally-funded research cover various environmental aspects of dredging and dredge spoil handling. The studies include the use of spoil sites, pollution control, effects on water quality, and sediment transport. Biological effects are included in a companion bibliography. (This updated bibliography contains 195 citations, 34 of which are new entries to the previous edition.)

PB81-850331 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Deicing Techniques and Equipment. January, 1970-August, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Aug 80.
Sep 80, 71p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the use of mechanical, chemical and other forms of deicing equipment. Applications in aircraft and automobiles as well as effects of road deicing salts are covered. (Contains 63 citations, fully indexed and including a table of contents.)

PB81-850349 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Deicing Techniques and Equipment. January, 1972-August, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Aug 80.
Sep 80, 105p

These citations discuss the use of mechanical, chemical and other forms of deicing equipment. Applications in aircraft and automobiles as well as effects of road deicing salts are covered. (Contains 102 citations, fully indexed and including a table of contents.)

PB81-852261 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Industrial Management and Decision Making Toward Environmental Pollution. February, 1978-June, 1980 (Citations from the Management Contents Data Base).
Rept. for Feb 78-Jun 80.
Jun 80, 145p NERACMNCNT1186

Research studies and articles cited in this bibliography discuss the economic, business, and industrial aspects of environmental protection. Citations discuss the new market demand for pollution control equipment and devices. Also considered are the environmental impacts of industrial wastes and dumping. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-858896 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Waterway Transportation. January, 1970-January, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 70-Jan 81.
Jan 81, 156p

This bibliography contains information on various modes of waterway transportation, e.g., oceans, rivers and canals. Design, development construction of ports, and control of waterways are also included. (Contains 144 citations, fully indexed and including a table of contents.)

PB81-858904 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Waterway Transportation. January, 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Jan 81.
Jan 81, 194p

This bibliography contains information on various modes of waterway transportation, e.g., oceans, rivers, and canals. Design, development construction of ports, and control of waterways are also included. (Contains 200 citations, fully indexed and including a table of contents.)

UCLA-12/1268 PC **A04**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Microenvironmental Changes and Plant Responses Due to Shading and Wind Deflectio by Solar Collectors: A Simulation Study.
D. T. Patten, and S. D. Smith. Nov 80, 71p
Contract AC03-76SF00012

The potential microenvironmental changes at the ground surface beneath arrays of solar mirrors or collectors were investigated in a Sonoran Desert ecosystem, utilizing a simulated array of plywood panels. The simulated array consisted of twelve panels designed to exhibit a similar shape, tilt, and spacing as is expected to occur in heliostat fields of solar thermal facilities or in arrays of photovoltaic collectors. The experimental design in the study was based on comparing two microsites in the simulated array versus the open desert. Presence of the panels results in up to a 90% reduction in solar radiance during the midday period, with microsites beneath each panel receiving about 14% of the open desert irradiance over the whole day. The array of panels also effected a 14% to 60% reduction in monthly accumulated wind flow in the center of the array. The combination of reduced radiant energy input and wind deflection resulted in significantly reduced surface and soil temperatures in the heavily shaded sites, and moderately reduced surface and soil temperatures in the sunny microsites. Plant responses to a cooler, moister environment were: (1) higher diversity and survival of winter spring annuals; (2) proliferation of C sub 3 annuals in the summer flora versus the more typical C sub 4 annuals in the open; (3) greater new shoot production of shrubs; (4) greater gross photosynthesis and stomatal conductance of the two shrub species in the warm dry season, but not in the cool wet season; (5) increased leaf retention and reduction in the typical leaf polymorphic character into the dry season of the drought deciduous Ambrosia deltoidea; and, (6) invasion of the heavily shaded areas of the array by a pseudoriparian species, Baccharis sarothroides. (ERA citation 06:005883)

13C. Construction Equipment Materials, and Supplies

PB81-148603 PC **A05**/MF **A01**
Louisiana Dept. of Transportation and Development, Baton Rouge. Research and Development Section.
Hot Plant Recycling of Asphaltic Concrete.
Final rept. Jun 78-Jun 80,
Donald E. Carey, and Harold R. Paul. May 80, 83p LA-78-2B(B), RR-143, FHWA/LA-80/143

This report covers the design, construction and evaluation of two hot mix recycling projects. One project recycled two inches of existing dense-graded asphaltic concrete through a modified batch plant. The second project recycled a total of five inches of existing asphalt surface treatment and sand-clay-gravel base through a modified dryer-drum plant. Each project was evaluated with respect to construction techniques, recycled mix quality, economics and energy conservation. Results are presented which indicate an acceptable recycled asphaltic concrete mixture was produced in each project.

PB81-150054 PC **A08**/MF **A01**
Asphalt Inst., College Park, MD.
Ordway Colorado Experimental Base Project Performance Studies.
Final rept. 1965-78,
James F. Shook, and Bernard F. Kallas. Oct 80, 161p FHWA-CO-RD-80-8
Sponsored in part by Colorado State Dept. of Highways, Denver.

The Ordway Colorado Experimental Base Project was a full-scale field experiment constructed with various thicknesses of two Full-Depth hot-mix sand asphalt bases and one Full-Depth asphalt concrete base and one thickness of a standard design with untreated base and subbase layers. Two different subgrades (an A-6 and A-7-6) were included in the experiment. The project was opened to traffic in 1965. Routine measurements were discontinued in 1976. Final measurements were made in 1978. The Project was planned as

an AASHO Road Test satellite project to be useful in extending the AASHO Road Test findings to Colorado conditions. The primary objectives were: (1) To determine relative thicknesses of one asphalt concrete base, two hot-mix sand asphalt bases and one standard design with untreated base and subbase required to give an equal level of pavement performance. (2) To relate certain measured properties of the pavement components to observed levels of performance using both empirical and theoretical models for pavement behavior. Field performance and laboratory data obtained during the period 1965-1978 have been summarized. Results of analyses of the data are included in the report.

PB81-151284 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Theoretical and Experimental Behaviour of Lightly Stiffened Box-Girder Diaphragms,
M. A. Crisfield. c1980, 39p TRRL-SUPPLEMENTARY-961
Also pub. as ISSN-0305-1293.

Two large-scale box-girder diaphragms were recently tested to destruction. The tests involved lightly stiffened diaphragms which were deliberately under-designed in relation to the Merrison Interim Design Rules. The present report compares the experimental results with solutions obtained using a non-linear finite element computer program. (Copyright (c) Crown Copyright 1980.)

PB81-858367 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Sandwich Structures. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 181p

The citations cover information on sandwich structures using various materials, combinations, and different forms and shapes. Physical and environmental testing of sandwich structures are also studied. (Contains 175 citations, fully indexed and including a table of contents.)

PB81-858375 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Sandwich Structures. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 194p

The citations cover global information on sandwich structures using various materials, combinations, and different forms and shapes. Physical and environmental testing of sandwich structures are also studied. (Contains 200 citations, fully indexed and including a table of contents.)

13D. Containers and Packaging

AD-A093 530/4 Not available NTIS
Northwestern Univ., Evanston, IL. Dept. of Civil Engineering.
Small-Scale Yielding at the Tip of a Through-Crack in a Shell,
J. D. Achenbach, and T. Bubenik. 7 May 79, 7p
Contract N00014-74-C-0063
Presented at the Pressure Vessels and Piping Conference, San Francisco, CA, 25-29 Jun 79.
Availability: Pub. in Jnl. of Pressure Vessel Technology, v102 p167-173 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 542/9 PC **A06**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Flame Tube and Ballistic Evaluation of Explosafe Aluminum Foil for Aircraft Fuel Tank Explosion Protection.
Final rept. Aug 77-Mar 79,
Thomas A. Hogan, and Charles Pedriani. Apr 80, 107p Rept no. AFWAL-TR-80-2031

This report presents the combustion and gunfire testing conducted by the AFWAL/PO and the AVRADCOM/Applied Technology Laboratory in support of a joint USAF/Army and Canadian Government project to evaluate an advanced metal foil explosion suppressor called Explosafe for potential use in protecting aircraft fuel tanks. This material is manufactured by Vulcan Industrial Packaging Limited, (VIPL), Explosafe Division, and is processed by slitting, expanding and stacking aluminum foil into batts. The density is varied either by changing the foil thickness at a constant expansion width or by changing the expansion width at a constant foil thickness. The scope of this in-house program was to determine: (1) the material's ability to suppress combustion overpressures through small scale laboratory testing and through full scale ballistic testing, (2) to establish an optimum material density versus performance and (3) to compare the results to the reticulated polyurethane foam. The AFWAL/PO conducted the laboratory tests in a flame tube over several densities of 3 foil thicknesses and the Army conducted the ballistic tests in a heavy structural fuel tank over 3 densities of 3 foil thicknesses. Results of these tests indicated that a 2.0 mil foil around the 2.0 no./cu ft region was an optimum foil thickness and weight density to be used in the remaining tests of the joint program.

AD-A093 657/5 PC **A02**/MF **A01**
Air Force Packaging Evaluation Agency, Wright-Patterson AFB, OH.
Performance Evaluation of Modified Type IV (XG3) Fast Pack,
Dwight S. Sheeter. Nov 80, 6p Rept no. PTPT-80-20

In support of SM-ALC/DSTE, a proposed Type IV, XG3, modified Fast Pack container was evaluated. The modification to the Fast Pack involved the replacement of the polyurethane cushion material with polyethylene foam material of the same structural configuration. Test results revealed average shock transmission ranging between 20 to 30 Gs. This compares favorably with the force experienced by lighter weight items packaged in standard fast packs. (Author)

PB81-152563 PC **A16**/MF **A01**
Radian Corp., Austin, TX.
Study of Air Pollution Control Technology: Case Studies of Air Pollution Control Technology Innovations.
Final rept.,
R. L. Leonard, A. S. Forrest, E. D. Gibson, T. A. Hall, and M. L. Personett. 13 Nov 80, 352p RAD-80-203-003-05, AQ-7421-15B
Contract 15-AQ-7421

The report presents the results of 67 personal interviews with individuals who were involved in the development of one or more of the eight control technologies under study--wet limestone flue gas desulfurization (FGD); dry FGD; atmospheric fluidized bed combustion; NOx control for utilities; Stage II hydrocarbon vapor recovery; three-way catalysts; SOx control for copper smelters and inherently low-polluting pushing processes for coke ovens.

13E. Couplings, Fittings, Fasteners, and Joints

AD-A093 515/5 PC **A02**/MF **A01**
Fiber Science, Inc., Salt Lake City, UT.
Helicopter External Cargo Sling Apex Fitting - Development and Testing.
Final rept. Apr 77-May 80,
Randy L. Crane, and Harvey D. Goff. Nov 80, 22p FSI-1140, USAAVRADCOM-TR-80-D-22
Contract DAAJ02-77-C-0026

A one-piece helicopter external cargo sling apex fitting was developed from Kevlar 29 to meet Army requirements for a lightweight, nonmetallic fitting that will facilitate cargo hook movement of sling-assisted loads. This report outlines the processes of material selection, design concepts, manufacturing methods, and testing undertaken to develop a versatile unit that meets or exceeds all previous criteria. (Author)

AD-A093 859/7 Not available NTIS
Propellants, Explosives and Rocket Motor Establishment, Waltham Abbey (England).
Interfacial Fracture Mechanical Aspects of Adhesive Bonded Joints -A Review,
A. J. Kinloch. 21 Apr 79, 31p PERME-MEMO-106, DRIC-BR-74780
Availability: Pub. in Jnl. of Adhesion, v10 p193-219 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

PAT-APPL-6-070 546 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Device for Absorbing Mechanical Shock.
Patent Application,
C. E. Newlon. Filed 29 Aug 79, 9p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention is a comparatively inexpensive but efficient shock-absorbing device having special application to the protection of shipping and storage cylinders. In a typical application, two of the devices are strapped to a cylinder to serve as saddle-type supports for the cylinder during storage and to protect the cylinder in the event it is dropped during lifting or lowering operations. In its preferred form, the invention includes a hardwood plank whose grain runs in the longitudinal direction. The basal portion of the plank is of solid cross-section, whereas the upper face of the plank is cut away to form a concave surface fittable against the sidewall of a storage cylinder. The concave surface is divided into a series of segments by transversely extending, throughgoing relief slots. A layer of elastomeric material is positioned on the concave face, the elastomer being extrudable into slots when pressed against the segments by a preselected pressure characteristic of a high-energy impact. The compressive, tensile, and shear properties of the hardwood and the elastomer are utilized in combination to provide a surprisingly high energy-absorption capability. (ERA citation 06:006373)

PATENT-4 203 303 Not available NTIS
Department of Energy, Washington, DC.
Torque-Balanced Vibrationless Rotary Coupling.
Patent,
D. M. Miller. Filed 28 Jul 78, patented 20 May 80, 6p PAT-APPL-929 134
Supersedes PAT-APPL-929 134-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This disclosure describes a torque-balanced vibrationless rotary coupling for transmitting rotary motion without unwanted vibration into the spindle of a machine tool. A drive member drives a driven member using flexible connecting loops which are connected tangentially and at diametrically opposite connecting points through a free floating ring. (ERA citation 06:005163)

13F. Ground Transportation Equipment

AD-A093 620/3 PC **A05**/MF **A01**
Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD.
Tactical Vehicle Evaluation Model (TVEM).
Technical rept.,
Stanley Butler, and Wayne Ferguson. Oct 80, 91p Rept no. AMSAA-TR-311

A computer model to compare tactical vehicle fleet mixes in an operational context has been adapted by the US Army Materiel Systems Analysis Activity (AMSAA) from a model developed at the US Army Transportation School. The Simulation, translated

into FORTRAN IV, is described herein. Also included are the program listing, program narrative, test case input and output, and other detailed documentation. (Author)

AD-A093 737/5 PC **A06**/MF **A01**
Army Mobility Equipment Research and Development Command, Fort Belvoir, VA.
Baseline Tests of the GE-100 Centennial Electric Passenger Vehicle.
Final technical memo.,
Edward J. Dowgiallo, Jr., Ivan R. Snellings, and William H. Blake. Sep 80, 105p Rept no. MERADCOM-2308
Contract EC-77-A-31-1042

The GE-100 Centennial electric vehicle is a one-of-a-kind prototype. Results of performance tests, speed, acceleration, gradeability, range, and efficiencies are presented. The GE-100 is powered by eighteen 6-volt lead-acid batteries driving a 16.3-kW d.c. series motor through an EV-1C controller. The motor drives the wheels through a chain drive to the differential. No regenerative braking was provided. (Author)

AD-A093 738/3 PC **A03**/MF **A01**
Army Mobility Equipment Research and Development Command, Fort Belvoir, VA.
Verification Test of Jet Industries Electra-Van 1000P,
Edward J. Dowgiallo, Jr., Ivan R. Snellings, and William H. Blake. Oct 80, 31p Rept no. MERADCOM-2311
Contract EC-77-A-31-1042

The Electra-Van 1000P is a Chrysler Corp. pickup truck which has been converted to an electric vehicle. It was tested as part of a Department of Energy demonstration program. The Electra-Van 1000P performance test results are presented. The 1000P is powered by 24 6-volt lead acid batteries through an SCR Controller to a 37-hp electric motor. It has a manual 4-speed transmission and front disc and rear drum brakes. It does not have regenerative braking.

AD-A093 746/6 PC **A03**/MF **A01**
Army Mobility Equipment Research and Development Command, Fort Belvoir, VA.
Verification Tests of the US Electricar Corp. Lectric Leopard.
Rept. for 15 Oct-30 Nov 79,
Edward J. Dowgiallo, Jr., and Ivan R. Snellings. Oct 80, 31p Rept no. MERADCOM-2312
Contract EC-77-A-31-1042

The 'Lectric Leopard' is a Renault Le Car that has been converted to an electric vehicle. It was tested as part of a Department of Energy demonstration program. The performance test results are presented in this report. The vehicle is powered by 16 6-volt lead acid batteries through a contactor to the 48-volt 12-horsepower traction motor. It is equipped with front disc brakes, drum rear, and torsion bar suspension. It does not have regenerative braking.

AD-A093 823/3 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Cooling Systems (Automotive).
Final rept. on test operations procedure.
13 Jan 81, 13p Rept no. TOP-2-2-607
Supersedes report dated 7 Nov 80, AD-A092 236.

This document provides guidance on how to evaluate the cooling characteristics of engine, power train, and auxiliary components when subjected to full- and part- throttle vehicle operations, repeated steering maneuvers, and exposure to extreme environments.

N81-15366/0 PC **A16**/MF **A01**
Eaton Corp., Southfield, MI. Engineering and Research Center.
Small Passenger Car Transmission Test: Dodge Omni a-404 Transmission.
Final rept.,
M. P. Bujold. Sep 80, 355p NASA-CR-165181, DOE/NASA/0124-5
Contracts DEN3-124, DE-A101-77CS-51044

The small passenger car transmission test was initiated to supply electric vehicle manufacturers with technical information regarding the performance of commercially available transmissions. This transmission was tested in accordance with a passenger car automatic transmission test code (SAE J65lb) which required drive performance, coast performance, and no load test conditions. Under these test conditions, the transmission attained maximum efficiencies in the mid eighty percent range for both drive performance test and coast performance tests.

N81-15465/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Characterization of the Near-Term Electric Vehicle (ETV-1) Breadboard Propulsion System over the SAE J227a Driving Schedule D.
N. B. Sargent, and M. O. Dustin. 1981, 15p NASA-TM-81664, E-684
Contract DE-AI01-77CS-51044
Prepared for Presentation at Soc. Of Automotive Engr. Intern. Congr. And Exposition, Detroit, 23-27 Feb. 1981.

The electric test vehicle one (ETV-1) was built from the ground up with present state of the art technology. Two vehicles were built and are presently being evaluated by NASA's Jet Propulsion Laboratory (JPL). A duplicate set of propulsion system components was built, mounted on a breadboard, and delivered to NASA's Lewis Research Center for testing on the road load simulator (RLS). Driving cycle tests completed on the system are described.

PAT-APPL-6-065 033 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Combined Hydraulic and Regenerative Braking System.
Patent Application,
R. R. Venkataperumal, and G. E. Mericle. Filed 9 Aug 79, 21p
Contract EY-76-C-03-1294
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A combined hydraulic and regenerative braking system and method for an electric vehicle is disclosed. The braking system is responsive to the applied hydraulic pressure in a brake line to control the braking of the vehicle to be completely hydraulic up to a first level of brake line pressure, to be partially hydraulic at a constant braking force and partially regenerative at a linearly increasing braking force from the first level of applied brake line pressure to a higher second level of brake line pressure, to be partially hydraulic at a linearly increasing braking force and partially regenerative at a linearly decreasing braking force from the second level of applied line pressure to a third and higher level of applied line pressure, and to be completely hydraulic at a linearly increasing braking force from the third level to all higher applied levels of line pressure. (ERA citation 06:006238)

PB81-141723 PC **A03**/MF **A01**
Statens Vaeg- och Trafikinstitut, Linkoeping (Sweden).
Barriaerkollision med Ambulans (Barrier Collision Test with an Ambulance),
Thomas Turbell. 1980, 32p VTI/MEDDELANDE-206
Summary in English and Swedish. Text in Swedish. Also pub. as ISSN 0347-6049.

The present Swedish requirements on the collision safety in ambulances are restricted to general recommendations like 'The interior shall be made such as no injuries will occur'. This type of requirements are of course very difficult to expound since there are no indications of the type and severity of the collision for which the requirements have to be met. In order to initiate a development in this field and get some information on the present situation a 'standard' barrier collision at 52 kmph has been made with an old ambulance. Before the test a number of 5 50-percentile test dummies were installed in positions regarded as typical for an emergency mission. One dummy simulated a patient on the stretcher. All dummies used existing restraint systems.

PB81-148082 PC **A06**/MF **A01**
Boeing Aerospace Co., Seattle, WA. Automated Transportation Systems.
Morgantown People Mover Electromagnetic Compatibility Program.
Final rept.,
T. H. Herring. Sep 80, 107p DOT-TSC-UMTA-80-35, UMTA-06-0048-80-10

Electromagnetic Compatibility (EMC) of a transit system is the absence of interference between all parts of the system, and between the system and the community which it serves. This report documents the EMC experience obtained during the design and development of the Morgantown People Mover (MPM) system in Morgantown, West Virginia. This report addresses background regarding the development of the MPM system and its current configuration as well as discussions pertaining to EMC. Conceptual and practical EMC requirement considerations and descriptions of the resulting requirements are presented. The analysis and testing performed to verify EMC is outlined and EMC problems unique to MPM are detailed. Refinement and extensions which might be considered for application to future systems are also discussed.

PB81-151342 PC **A04**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div.
Body Corrosion in Transit Buses.
Final rept.
Nov 80, 69p BP-80-001, UMTA-MD-06-0024-81-1
Contract DOT-UT-70032

Corrosion of body components on transit buses has been considered a major problem throughout the United States. Since the basic objective of this study was to help establish a new Advanced Design Bus (ADB) price adjustment for a corrosion-resistant body, it was necessary to investigate the experience of transit operators with body corrosion on buses produced prior to the ADB (a bus body constructed almost entirely of stainless steel with skin panels of plastic). This report examines the extent and magnitude of body corrosion problems in existing bus fleets. Body corrosion appears to be severe in two general areas of the country: areas where salt is heavily used on streets in the winter, and areas with high humidity along southern seacoasts. A telephone survey of 21 operating properties was conducted regarding the bus body corrosion problem. The results of these interviews are summarized herein. In addition, seven operating properties were visited to ascertain the magnitude of the body corrosion problem including: Miami, Florida; Houston, texas; Harlingen, Texas; Brownsville, Texas; Buffalo, New York; and Detroit Michigan. This study concludes that: (1) there are distinct types of bus body corrosion that occur only in certain areas; (2) corrosion is generally a cosmetic problem and does not create safety hazards or cause bus deterioration structurally; (3) with some exceptions, bus corrosion is limited to vehicles over ten years old; and (4) corrosion costs are relatively low.

PB81-151367 PC **A08**/MF **A01**
Boeing Aerospace Co., Seattle, WA. Automated Transportation Systems.
Morgantown People Mover Redundant Computing System Design Summary.
Final rept.,
Jim I. Rucker, and Bert J. Hill. Sep 80, 159p
DOT-TSC-UMTA-80-36, UMTA-MA-06-0048-80-8

The purpose of this report is to describe the redundant computing system design used for the current 1980 Phase II Morgantown People Mover (MPM) system. The redundant computing system is that part of the control and communications system (C&CS) consisting of redundant computer hardware and software and the special purpose equipment (SPE) used to interface the dual computing system to the rest of the C&CS system. The Morgantown project, which began in 1969, is an Urban Mass Transportation Administration program that provides a personal rapid transit system between the central business district of Morgantown, West Virginia, and the widely separated campuses of West Virginia University. The MPM system is an automated, two-mode (schedule and demand) transit system that consists of a fleet of electrically powered, rubber-tired, passenger-carrying vehi-

cles operating on a dedicated guideway network under the redundant computing system computer control. Since the MPM system was developed in three phases, this report presents some historical data leading to the current design. The report also includes results of experience with the redundant computing system, plans for potential system improvement, and recommendations so that future system designers can benefit from the experience gained in developing the Phase II MPM system.

PB81-154940 PC **A04**/MF **A01**
California State Dept. of Transportation, Sacramento.
Evaluation of Three Demonstration Parking Facilities in California.
Final rept. Mar 78-Aug 79,
R. Patton Thompson. Jun 80, 63p 623152,
FHWA/RD-80/046
Contract DOT-FH-11-9125

This report evaluates the effectiveness of three demonstration parking facilities in stimulating carpooling and transit ridership. Results of the evaluation show that two of the test facilities were very successful and the third one was less so. Location is a very important factor contributing to the success of a parking facility. Good transit service and other ridesharing incentives, such as express lanes for buses and carpools, can also play important roles in the success of parking facilities. The report recommends several characteristics that parking facilities should have and also recommends certain design features in order to maximize its' chances for success.

PB81-156390 PC **A12**/MF **A01**
CONSAD Research Corp., Pittsburgh, PA.
Railroad Corridor Consolidation-Analyses and Implications.
Final rept.,
D. E. Matzzie, B. D. Hillegas, and T. R. Bell. Apr 79, 253p
Contract DOT-OS-60154
Portions of this document are not fully legible.

The consolidation of railroad mainlines is analyzed in a benefit/cost format, from the viewpoint of (1) the railroad companies involved, (2) affected shippers and receivers, and (3) the general public. To the extent possible, the analysis is conducted in a quantitative manner. Methods for conducting the analysis are developed and described, in detail, in the form of a manual. The methods are applied to two case studies: one intra-railroad consolidation (on the Seaboard Coastline Railroad) and one inter-railroad consolidation (among the Rock Island and the Milwaukee). The results of the two case studies are documented. The methods presented are evaluated and several generalized observations are drawn.

UCRL-85141 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Inductive Energy Transfer in Transportation.
C. E. Walter, and J. D. Salisbury. 8 Nov 80, 31p
CONF-801162-1
Contract W-7405-ENG-48
UMTA R and D conference, Norfolk, VA, USA, 21 Nov 1980.

The DOE program for studying the use of inductive energy transfer in transportation systems is reviewed. An inductive energy transfer system has an energy source consisting of insulated electrical conductors placed beneath the surface of a roadway, aligned with the direction of travel, and fed a relatively high alternating current. A vehicle, e.g., car, bus, or rail car, is equipped with a coil suitably wrapped around magnetic material and suspended beneath the vehicle a short distance from the road surface. The ac in the energy source produces an alternating magnetic field which couples inductively with the power pickup coil under the vehicle and results in vehicle propulsion. Investigations of this energy source for transportation in the US have considered the effect of its use on petroleum fuel consumption, system design and operation factors, adaptability to city and highway transportation, vehicle performance, and assessment of the application of this system to automobiles carrying auxiliary battery power equipment. These studies are briefly described. (ERA citation 06:006234)

13G. Hydraulic and Pneumatic Equipment

N81-15403/1 PC **A02**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Tests with Pressure Impulses of a Metric Implement for ISO Couplings (Gathering of Tests, General Conclusions) Essais aux Impulsions de Pression d'Une Implantation Metrique pour Raccords ISO (Ensemble des Essais, Conclusions Generales).
Final rept.,
J. L. Lanier. 23 Jun 80, 16p CETIM-14.J.221
Text in French.

Performance tests were conducted to determine the efficiency of a so-called universal orifice which accepts four kinds of modes of couplings (metal on metal, toroidal joints, composite joints, and soft metal) and covers almost all mechanical applications. The universal orifice can be considered satisfactory provided that the maximum pressures for use are defined for each dimension. Those orifices actually in use at T.H.P. are satisfactory. By keeping the same quality criteria for the new orifice, the nominal maximum pressure will not exceed 400 bars for a diameter of 10 and should increase for orifices with greater dimensions.

PATENT-4 187 764
Not available NTIS
Department of Energy, Washington, DC.
Fast-Acting Valve Actuator.
Patent,
N. Cho. Filed 12 Jul 72, patented 12 Feb 80, 4p
PAT-APPL-270 796
Supersedes PAT-APPL-270 796-72.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fast-acting valve actuator utilizes a spring driven pneumatically loaded piston to drive a valve gate. Rapid exhaust of pressurized gas from the pneumatically loaded side of the piston facilitates an extremely rapid piston stroke. A flexible selector diaphragm opens and closes an exhaust port in response to pressure differentials created by energizing and de-energizing a solenoid which controls the pneumatic input to the actuator as well as selectively providing a venting action to one side of the selector diaphragm. (ERA citation 06:006371)

13H. Industrial Processes

AD-A093 446/3 PC **A16**/MF **A01**
General Dynamics/Pomona, CA. Pomona Div.
Manufacturing Technology Program for Microwave Components.
Final rept. Mar 79-Feb 80,
William L. MacTurk. 28 Apr 80, 363p NAVSEA-MT-S-617-78, NOSC-TR-560
Contract N66001-79-C-0022

The work contained in this report details the activities accomplished from March 1979 to the end of February 1980 by the Advanced Manufacturing Technology Section at General Dynamics, Pomona Division, on a Manufacturing Technology Program for Microwave Components. Specifically, this program deals with the injection molding and plating of a plastic microwave waveguide post filter operating in the S band region and suitable for use on the Navy Phalanx Ship/Gun System now under production at General Dynamics Pomona. (Author)

AD-A093 645/0 PC **A08**/MF **A01**
Phrasor Scientific, Inc., Duarte, CA.
Development of a Tabletop Model for the Generation of Amorphous/Microcrystalline Metal Powders.
Interin technical rept. 1 May 78-30 Apr 80,
John F. Mahoney, Julius Perel, Zef Shanfield, and Bernard E. Kalensher. 30 Apr 80, 170p Rept no. 80-1
Contract N00014-77-C-0373, ARPA Order-3363

Electrohydrodynamics (EHD) has been explored for the generation and control of charged liquid droplets in order to produce micro-size particles and splat coatings. The aim of this work is the development of a Tabletop Powder Generator capable of controlled production of powder sizes that are both smaller and more narrowly distributed than those produced by conventional atomizers. This tool is being designed for use in fundamental studies of the effect of solidification variables on microstructures and the development of new alloy compositions attainable through rapid solidification processing. The EHD technique requires the use of intense electric fields to generate liquid droplets directly from the liquid state. This is achieved by delivering a molten alloy to the tip of a fine capillary nozzle to which high voltage is applied. A variety of droplet source configurations and materials were explored on this program. Resistance heater technology was improved resulting in greater reliability and temperatures of 1800K were achieved while experiencing minimal erosion. Several modes of source operation were encountered depending upon the interaction of the molten metals with source materials. Rapid solidification and cooling rates of beam droplets in a vacuum environment have been analyzed from novel points of view. Powders smaller than 0.01 micron have been produced with calculated cooling rates of approximately 10,000,000 K/s from radiation cooling alone.

AD-A093 727/6 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Diffusion Welding of Copper to Titanium by Hot Isostatic Pressing (HIP).
Final rept.,
Saul Isserow. Dec 80, 14p Rept no. AMMRC-TR-80-55

Results are reported for hot isostatic pressing (HIP) tests to define the parameters for diffusion welding of copper to a titanium alloy. Two test configurations were used. The principal objective of the tests was to determine the extent to which strong metallurgical bonds can be achieved under conditions milder than the reference one hour/15,000 psi/1200 F. Successful combinations of pressing parameters included: (1) lower temperature, and (2) even lower temperature or lower pressure where longer time offsets the milder condition. (Author)

AD-A093 877/9 PC **A17**/MF **A01**
General Electric Co., West Lynn, MA. Aircraft Engine Group.
T700 Blisk and Impeller Manufacturing Process Development Program.
Final rept. Jul 75-Jun 79,
W. A. Hunter, and G. A. Grimmer. Nov 79, 390p
R80AEG035, USAAVRADCOM-TR-80-F-1
Contract DAAJ01-75-C-0844
Report on Manufacturing Methods and Technology (MANTECH) Program.

Highly automated processes were developed to machine and control the quality of airfoils on the blisks and impeller which are the principal rotating components of the compressor for the T700-GE-700 engine, which powers advanced military helicopters. This development was carried out under a Manufacturing Methods and Technology contract awarded by the Army Aviation System Command, which later became the Army Aviation Research and Development Command (AVRADCOM), to the Aircraft Engines Business Group of the General Electric Company in Lynn, Massachusetts. Processes which were previously available, and which were used to produce airfoils for development engines, were too costly and too dependent on manual skill to meet volume production requirements. Five-axis precision contour milling was developed to machine the airfoils of the five axial flow blisk stages and the impeller, all of which are integral with their supporting disk. A new milling machine was designed for this process, which machines four identical parts simultaneously. This machine is directed by advanced computer numerical control. The programs which supply positioning information to this control for machining blisk airfoils were developed with APT; and special programming techniques that were devised for these programs. The programs for machining impeller airfoils were developed with HECTRAN, which is a proprietary processor for impeller machining programs.

N81-15036/9 PC **A02**/MF **A01**
Centre Technique des Industries Mecaniques, Saint-Etienne (France).
Study of the Influence of Metallurgical Parameters in Electrochemical Machining by Electron Spectrometry Surface Analysis (Esca) Etude de l'Influence des Parametres Metallurgiques en Usinage Electrochimique Par l'Analyse des Surfaces Par Spectrometrie d'Electron (Methode Esca).
Final rept.,
C. Schepacz. Jun 80, 17p CETIM-1.3F.22.9
Text in French.

The effect of silicon and i carbon in the dissolution mechanism of ultrapure iron, in 42 NDC 19 steel and in two versions of Z38 CDV 5-3 steel was studied to determine the role played by both these elements in the electromachining process. At weak volumes, between 0% and 0.4%, even the least variaton of silicon and carbon is sufficient to displace curves of the speed of machining, carrying with them a modificaton in the quota of pieces machined.

N81-15157/3 PC **A03**/MF **A01**
Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium).
Report on the Activities in Technological Research in Regards to Belgian Industries Rapport Annuel du Comite Permanent au Conseil General.
Annual rept.,
18 Jun 80, 34p
Text in French.

Research in mechanical engineering is discussed with special emphasis on construction processes and materials, including plastics and metals. Mechanization of industrial plants is discussed along with automation technology for industiral applications.

N81-15368/6 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Bremen (Germany, F.R.). Inst. fuer Angewandte Materialforschung.
Welding of HY100 Steel Erfahrungen Beim Schweissen des Stahls HY 100.
R. Fleer, S. Klingauf, K. Seifert, and E. Staskewitsch. 1979, 54p BMVG-FBWT-79-34
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

A short survey is on this type of steel, its composition, structure, the heat treatment applied and the mechanical properties. Results of thermal cutting processes are given. The cutting with oxyacetylene, plasma arc and plasma arc with water injection were compared. Metallographic investigation as well as hardness measurements were used as evaluation methods. Welding experiments using arc-welding and MAG-techniques are described and the best parameters are presented. This type of structural steel is more sensitive to hot cracking than the carbon steels compared with. Therefore, the welding process should be carried out with minimum heat input. The procedure for selecting suitable filler materials, which was done by special tension tests of the weldments, is described. The toughness of the welded joints was also investigated.

N81-15873/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Properties of Various Silicon Oxide Phases in Thin Films.
E. Ritter. Aug 80, 20p NASA-TM-75908
Contract NASW-3198
Transl. Into English from Vakuum-Tech. (Germany, F.R.), V. 21, No. 2, 1972 p 42-48. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Layers of SiO2 with reproducible properties can be manufactured relatively easily today. In the case of SiO and Si2O3 layers, it is necessary to carefully check all of the manufacturing parameters for producing layers with reproducible properties. The properties of the layers in the case of SiO2 do conform to expectations. In the case of Si2O3 and SiO, they can be understood at least qualitatively. Additional interesting models are available for a quantitative understanding.

PATENT-4 198 740
Not available NTIS
Department of Energy, Washington, DC.
Method for Forming or Bonding a Liner.
Patent,
T. S. Prevender. Filed 24 Jul 78, patented 22 Apr 80, 4p PAT-APPL-927 237
Supersedes PAT-APPL-927 237-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A process and means are provided for forming or bonding a liner to a shell or element wherein the liner is filled with or immersed in water and a portion of the water is frozen. (ERA citation 06:005165)

PB81-147274 PC **A03**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Shape-Casting Titanium in Olivine, Garnet, Chromite, and Zircon Rammed and Shell Molds.
Rept. of investigations/1980,
R. K. Koch, and J. M. Burrus. 1980, 40p BUMINES-RI-8443

In seeking substitutes for such critical metals as chromium, cobalt, and nickel, the Bureau of Mines investigated techniques for shape-casting titanium in rammed sand molds. Castings were made in olivine, garnet, chromite, and, for comparison, zircon. It was found that commercial-grade castings up to 31 lb (maximum capacity of furnace) could be made in zircon or olivine molds if a zirconia mold wash was used. Castings up to 4 lb could be made in chromite molds, but heavier castings suffered from some mold-metal reaction. Garnet molds were found to be unsatisfactory for castings of all sizes because of gasblows and rough surfaces. In other tests shell castings of acceptable quality produced in water-molds were unsatisfactory because rough casting surfaces were caused by mold-metal reaction. Unlike the currently used commercial processes, neither the rammed-sand nor the shell-molding processes developed by the Bureau of Mines generate noxious fumes at any step.

PB81-147597 PC **A05**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Committee to Define Worker-Related Research for Adaptable-Programmable Assembly Systems, Final Report of a Meeting Held August 19-22, 1980,
L. F. Hanes, Steven Beckman, Tibor Csaky, Colin G. Drury, and Joel Fadem. 7 Nov 80, 85p NSF/RA-800326

Areas were identified in which research on the impact of robotic automation technology on human individuals should be conducted. The committee established to study this matter was commissioned to: (1) identify and rank studies which might be conducted during simulated production tests of adaptable-programmable assembly systems (APAS) equipment at the Westinghouse Research and Development Center; (2) identify human factors whic should be performed prior to APAS tests; and (3) identify worker-related research beyond the scope of APAS tests. The committee defined major human-related problems and advantages of the new technology. Problems were defined and examined in connection with resistance to change, training, safety, environmental effects, and work schedules. On the basis of these definitions, 12 areas of research to accompany APAS tests, 12 human factor tasks to be performed before APAS tests begin, and 14 important research areas beyond the scope of APAS tests were identified. Appendices offer an illustration of the APAS endbell assembly, responses to a committee questionnaire, and a list of possible objectives of worker-related research studies to be implemented during the APAS simulated production tests.

PB81-148256 PC **A03**/MF **A01**
Bureau of Mines, Rolla, MO. Rolla Research Center.
Experiments in Hot-Rolling and Forging of Ductile Cast Iron.
Rept. of investigations/1980,
L. A. Neumeier, B. A. Betts, and R. L. Crosby. 1980, 43p BUMINES-RI-8448

The Bureau of Mines investigated hot-rolling and forging characteristics of experimental ductile iron castings, both sand and permanent-mold, made with charges containing up to 70 pct foundry pig iron and 95 pct steelmaking pig iron. Between 1,550 and 1,950 F, most castings could be rolled to 90-pct reduction or forged to 70-pct reduction without serious cracking. Charge and composition have less bearing on workability than on subsequent properties. Permanent mold castings could be worked as readily as sand castings at 1,750 and 1,950 F. Plasticity improved with temperature. Small billets were also forged cold to 50-pct reduction without cracking.

PB81-150096 PC **A03**/MF **A01**
Bureau of Mines, Albany, OR. Albany Research Center.
Cladding of Metals to Iron by Vacuum Rolling.
Rept. of investigations/1980,
R. Blickensderfer. 1980, 32p BUMINES-RI-8481

To investigate cladding, a vacuum-rolling mill capable of rolling bimetal specimens at temperatures to 1,300 C in a residual gas pressure of 2 x 0.00002 torr was established. Metals that were successfully bonded to iron included stainless steels, chromium, nickel, nickel alloys, copper, and several refractory metals including molybdenum and titanium. The effects of the rolling temperature, reduction in thickness, rolling speed, and residual air pressure on bonding strength and bend ductibility of the bimetals were determined. Optimum rolling conditions produced bimetals with bond shear strength essentially equal to that of the iron base metal.

PB81-802977 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Manufacturing in Space. 1976-October, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-Oct 80.
Jan 81, 119p
Supersedes NTIS/PS-79/1053. Sponsored by National Technical Information Service, Springfield, VA.

The cited articles from the international literature concern aspects of manufacturing in space. Stressed are the effects of weightlessness on a variety of manufacturing processes such as crystal growth, welding, zone melting, casting, and the construction of structures. Articles concerning materials science research in the European Spacelab program are included. (This updated bibliography contains 437 citations, 106 of which are new additions to the previous edition.)

13I. Machinery and Tools

N81-15367/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Axial Force and Efficiency Tests of Fixed Center Variable Speed Belt Drive.
D. J. Bents. 1981, 31p NASA-TM-81652, DOE/NASA/51044-13
Contract DE-A101-77CS-51044
Proposed for Presentation at Soc. Of Automotive Engr. Intern. Congr. And Exposition, Detroit, 23-27 Feb. 1981.

An investigation of how the axial force varies with the centerline force at different speed ratios, speeds, and loads, and how the drive's transmission efficiency is affected by these related forces is described. The tests, intended to provide a preliminary performance and controls characterization for a variable speed belt drive continuously variable transmission (CVT), consisted of the design and construction of an experimental test rig geometrically similar to the CVT, and operation of that rig at selected speed ratios and power levels. Data are presented which show: how axial forces exerted on the driver and driven sheaves vary with the centerline force at constant values of speed ratio, speed, and output power; how the transmission efficiency varies with centerline force and how it is also a function of the V belt coefficient; and the

axial forces on both sheaves as normalized functions of the traction coefficient.

PATENT-4 196 522
Not available NTIS
Department of Energy, Washington, DC.
Alignment Fixture.
Patent,
G. C. Bell, and O. T. Gibson. Filed 30 Apr 79, patented 8 Apr 80, 4p PAT-APPL-6-034 790
Supersedes PAT-APPL-6-034 790.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A part alignment fixture is provided which may be used for precise variable lateral and tilt alignment relative to the fixture base of various shaped parts. The fixture may be used as a part holder for machining or inspection of parts or alignment of parts during assembly and the like. The fixture includes a precisely machined diameter disc-shaped hub adapted to receive the part to be aligned. The hub is nested in a guide plate which is adapted to carry two oppositely disposed pairs of positioning wedges so that the wedges may be reciprocatively positioned by means of respective micrometer screws. The sloping faces of the wedges contact the hub at respective quadrants of the hub periphery. The lateral position of the hub relative to the guide plate is adjusted by positioning the wedges with the associated micrometer screws. The tilt of the part is adjusted relative to a base plate, to which the guide plate is pivotally connected by means of a holding plate. Two pairs of oppositely disposed wedges are mounted for reciprocative lateral positioning by means of separate micrometer screws between flanges of the guide plate and the base plate. Once the wedges are positioned to achieve the proper tilt of the part or hub on which the part is mounted relative to the base plate, the fixture may be bolted to a machining, inspection, or assembly device. (ERA citation 06:005166)

PB81-148934 PC **A09**/MF **A01**
Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
General Methods to Enable Robots with Vision to Acquire, Orient and Transport Workpieces.
Rept. no. 6,
J. Birk, R. Kelley, T. Barron, J. Crouch, and D. Duncan. Aug 80, 196p NSF/RA-800334
Grant NSF-DAR78-27337
See also rept. no. 4, dated 15 Jul, PB-297 199.

Progress in developing robots with vision to acquire, orient and transport workpieces is reported. These methods are intended to enhance the range of industrial applications to which robots can be applied. The problem of feeding workpieces that are unoriented in bins has been adopted as the focus of research because it is a generic problem in manufacturing industries. The following aspects of this project are discussed in the appendices: (1) a robot system which can acquire a class of workpieces from a bin and pose them at a goalsite; (2) a robot system which can acquire cylindrical workpieces from a bin; (3) design of a special electronic processor for extracting features based on local gradient direction histograms; (4) guidelines for the design of robot hands for handling parts that are not preoriented; (5) some fundamental issues in estimating the pose of a workpiece; (6) determination of how accurately it is possible to estimate the angle of a two-dimensional object which can rotate about an axis parallel to the optical axis; (7) four calibration methods to find rays in space corresponding to picture elements in a TV camera image; (8) a general method of estimating the pose of a workpiece; (9) results obtained using the Hough transformation technique to extract straight edge segments; and (10) a schedule of presentations made to industrial advisors.

PB81-803074 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Antifriction Bearings. 1973-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Dec 80.
Feb 81, 25p
Supersedes PB80-803943. Sponsored by National Technical Information Service, Springfield, VA.

These citations from the international literature provide descriptions of tribological studies of materials and designs that provide low friction performance. The articles include analyses and characterizations of bearing and lubricant systems. The environments considered entail temperatures from the cryogenic region to 900C and loads up to 20,000 psi. (This updated bibliography contains 94 citations, 17 of which are new additions to the previous edition.)

PB81-854580 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Design and Applications of Fly Wheels. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Nov 80, 198p
Sponsored in part by National Technical Information Service, Springfield, VA.

Worldwide information covers the design and varied applications of flywheels and reaction wheels. Such diversified applications as satellite stabilization,surface vehicle propulsion, energy transfer devices, and inertia or friction welding are discussed. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-854598 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Design and Applications of Fly Wheels. January, 1972-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Nov 80.
Nov 80, 105p

Worldwide information covers the design and varied applications of flywheels and reaction wheels. Such diversified applications as satellite stabilization, surface vehicle propulsion, energy transfer devices, and inertia or friction welding are discussed. (Contains 94 citations, fully indexed and including a table of contents.)

PB81-858607 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Welding Machines. January, 1970-January, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 70-Jan 81.
Jan 81, 64p NERACUSGNT2611

This bibliography covers information concerning welding machines and accessories. Topics also include automation, and computer controlled, and robot aided welding machines. (Contains 63 citations, fully indexed and including a table of contents.)

PB81-858615 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Welding Machines. January, 1976-January, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jan 81.
Jan 81, 118p

This bibliography covers information concerning welding machines and accessories. Topics also include automation, and computer controlled, and robot aided welding machines. (Contains 122 citations, fully indexed and including a table of contents.)

PB81-858623 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Welding Machines. January, 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Jan 81.
Jan 81, 173p

This bibliography covers information concerning welding machines and accessories. Topics also include automation, and computer controlled, and robot aided welding machines. (Contains 200 citations, fully indexed and including a table of contents.)

SORI-EAS-78-399 PC **A11**/MF **A01**
Southern Research Inst., Birmingham, AL.
Structural Materials Evaluation for Oxygen Centrifugal Compressors. Final Report, Project 3526, Report XXXVI.
5 Sep 78, 229p
Contract AC21-76MC08010

Several of the processes for producing high Btu gas from coal require large volumes of high pressure oxygen. Large centrifugal compressors can supply the volumes needed, and the basic engineering technologies for design, stress analysis, rotor balancing, and construction of centrifugal compressors appear to exist. However, there are compatibility problems between compressor construction materials and oxygen. About all of the major component construction materials in past designs will oxidize, some violently, if ignition occurs. Materials must be selected that satisfy the mechanical requirements and are resistant to both ignition and propagation of a fire. This program was conducted to gather the available information on current materials used in compressor construction, known causes of fires, and the compatibility of materials with high pressure, high velocity oxygen. This information was obtained by first gathering and analyzing both domestic and foreign sources of literature and by visits to the leading centrifugal compressor producers in the US. Several events such as friction between moving and fixed components, local excursions in the oxygen temperature, debris-induced rub, impact, and exposure of unoxidized metal to the oxygen were found to contribute to the ignition and combustion of materials in compressors. A test cell was constructed to simulate several of these events. Experiments were conducted under conditions such as actually exist inside a compressor using various metals. The results were then analyzed in terms of modern ignition and combustion theories and the influence of various compressor conditions on combustion. (ERA citation 06:006362)

UCRL-85004 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Machine Tool Task Force.
G. P. Sutton. 22 Oct 80, 32p CONF-8010143-1
Contract W-7405-ENG-48
12. annual Tri-Service Manufacturing technology conference, Bal Harbour, FL, USA, 22 Oct 1980.

The Machine Tool Task Force (MTTF) is a multidisciplined team of international experts, whose mission was to investigate the state of the art of machine tool technology, to identify promising future directions of that technology for both the US government and private industry, and to disseminate the findings of its research in a conference and through the publication of a final report. MTTF was a two and one-half year effort that involved the participation of 122 experts in the specialized technologies of machine tools and in the management of machine tool operations. The scope of the MTTF was limited to cutting-type or material-removal-type machine tools, because they represent the major share and value of all machine tools now installed or being built. The activities of the MTTF and the technical, commercial and economic significance of recommended activities for improving machine tool technology are discussed. (ERA citation 06:006366)

13J. Marine Engineering

AD-A093 474/5 PC **A04**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Davidson Lab.
A Partially Cavitating Hydrofoil in a Gust.
Final rept. 15 Nov 78-30 Nov 80,
A. S. Peters, Theodore R. Goodman, and John P. Breslin. Nov 80, 56p Rept no. SIT-DL-80-2118
Contract N00014-77-C-0122
Supersedes report dated Sep 77, AD-A044 307.

An analysis is made of a hydrofoil with partial cavitation in a traveling gust. The problem is formulated in the time domain with pressure (acceleration potential) as the fundamental dependent variable. It is shown that, in the limit, as the aspect ratio of the foil becomes large, the second time derivative of the cross-sectional area of the cavity vanishes regardless of the shape of the gust. Integral equa-

tions are presented through which the length of the cavity and the unsteady pressure distribution on the foil can be determined. Since these equations are highly nonlinear and require formidable numerical procedures to solve, no attempt is made to solve them. It is shown in an appendix that the earliest possible appearance of a nonvanishing second time derivative of the cross-sectional area of the cavity is to the order of the square of the reciprocal of the aspect ratio and that to this order the pressures at distances large in comparison with the chord of the foil (but not the span) grow logarithmically. It may be inferred from this result that the pressures in the far field can be reduced by increasing the aspect ratio. (Author)

AD-A093 535/3 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Ship Hydrodynamics Lab.
Relationship of Underkeel Clearance and Vessel Speed to Grounding,
Armin W. Troesch, and Stuart Cohen. Apr 80, 15p Rept no. 017999

The sinkage, trim, and underkeel clearance of the lead barges in a 3 x 3 barge train were measured. The barges represented typical Mississippi River barges. The tests were conducted in response to a USCG request to investigate groundings due to channel depth decreases. The water depth varied from 2.6 to 1.05 times the barges' draft. There were two bottom contours: one with constant depth, and one with an underwater obstacle in the form of a step. The speed of the barge train was varied from 2 kts to 8 kts, full scale. (Author)

AD-A093 740/9 PC **A02**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
Effect of Freestream Radial Velocity Component on Hydrodynamic Analysis of Propellers.
Final rept.,
Terry Brockett. Oct 80, 19p Rept no. DTNSRDC/SPD-0872/03

For wake fields with circumferential averages that include a small radial component, an additional term arises in the mathematical model used for design or performance prediction of propellers that has been previously overlooked. This term arises from the boundary condition that the blade is impenetrable and is a function of only geometry and the inflow radial velocity component. This simple additional term is shown to be important for the example considered, leading to a variable change in camber and a pitch reduction. (Author)

AD-A093 825/8 PC **A05**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Work Systems Package/Pontoon Implacement Vehicle Operational Testing at San Clemente Island, 1979. Demonstration of a Technology for Remotely Controlled Deep-Water Recovery of Objects up to 5 Tons from Depths to 20000 Feet.
Final rept. Oct 78-Sep 79,
R. L. Wernli. 6 Jun 80, 80p Rept no. NOSC-TR-553

The Work Systems Package, mated to the Pontoon Implacement Vehicle, recently completed extensive in-water testing to depths of 95 feet at the Navy's San Clemente Island test facility, in order to investigate techniques for attaching, rigging, and recovering objects using a remotely controlled vehicle/work system. Objects ranged from heavy steel structures to aircraft and components. Lifting methods included use of vehicle thrusters, variable ballast, and a remotely controlled module with a 10,000-pound lift capability. Valuable information concerning recovery technology was acquired during the mission, a highlight of which was the successful rigging and lift of a 10 000-pound F4 Phantom jet fuselage. Excellent data and photographic documentation were obtained. A total of 58 hours of in-water testing was performed in 14 dives. (Author)

AD-357 962/0 PC **A03**/MF **A01**
Bureau of Ships, Washington, DC.
Standard Recovery Procedure for Tactical Decontamination of Ships
F. S. Vine, and W. L. Owen. 20 Mar 59, 46p AEC-WT-1323
Report on Operation Redwing, Project 2.9 (U).
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The objectives of this project were (1) to proof test a proposed standard recovery procedure for the tactical decontamination of Navy ships and (2) to perform, as required, an operational decontamination of each of three test ships to enable them to make their next scheduled participation. Three washdown-equipped test ships, the YAG-39, the YAG-40, and the LST-611, served as fallout-collection stations and test platforms for other Program 2 projects. These ships were successively contaminated by radioactive fallout from Shots Zuni, Flathead, Navajo, and Tewa. Because of insufficient contamination aboard the ships on their arrival at Eniwetok Lagoon following their several missions, the primary objective was not fulfilled. Therefore, the function of Project 2.9 was generally restricted to operational decontamination between shots. (Author)

AD-357 963/8 PC **A04**/MF **A01**
Naval Radiological Defense Lab., San Francisco, CA.
Verification of Shipboard Washdown Countermeasure
W. J. Armstrong, M. M. Bigger, and H. B. Curtis. 12 Feb 59, 58p AEC-WT1324
Report on Operation Redwing, Project 2.10 (U).
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

Project 2.10 was conducted to verify the effectiveness of a washdown system as a radiological countermeasure for ships. The evaluations were made possible by the requirement for washdown-equipped ships to be stationed within the region of tactically significant fallout in order to support several projects in the fallout characterization program of Operation Redwing. To fulfill the instrumentation requirements of Program 2, the Bureau of Ships test ships, YAG39 and YAG-40, were employed. Washdown effectiveness was measured by a comparison of gamma radiation field measurements taken in the unwashed control area forward and the washed after portion of each ship. The test ships participated in five shots and at least one of them was sufficiently contaminated in four of these to make washdown evaluation feasible. Maximum levels of gamma radiation encountered range from 266 mr/hr at 11 hours after Shot Flathead to 21.2 r/hr at 4.6 hours after Shot Tewa. (Author)

AD-477 201/8 PC **A03**/MF **A01**
David Taylor Model Basin, Washington, DC. Aerodynamics Lab.
Wind-Tunnel Tests to Determine the Air-Flow Characteristics in the Wakes of Three Aircraft Carrier Models. Part II - Tests of the Attack Carrier CVA 62,
Herbert E. White. Jun 59, 32p Rept nos. DTMB-Aero-955-Pt-2, DTMB-C-1073
See also Part 1, AD-477 200 and Part 3, AD-477 202.
Distribution limitation now removed.

Tests of a 1/144-scale model CVA 62 aircraft carrier were conducted in the wind tunnel to determine the local dynamic pressures in the area downwind of the carrier. Surveys were made with a pitot-static rake for three directions of relative wind. Plots are presented showing the ratio of local to free-stream dynamic pressure at various locations. Also, a representative plot is presented which shows the dynamic pressure profiles encountered along a typical approach path for an assumed set of conditions. The data show that, from the dynamic pressure viewpoint, wind over the bow at 0 deg. is the most favorable condition. With wind at 10 deg. to port (nearly aligned with the center line of the canted deck), and at 20 deg. the conditions are considerable less favorable. (Author)

AD-840 551/6 PC **A03**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Unsteady Lift and Hinge Moment Characteristics of the Ag(Eh) Main Foil and Strut Assembly,
William C. O'Neill. Jul 68, 40p Rept no. NSRDC-2805
Distribution limitation now removed.

The unsteady lift and hinge moment characteristics of a 1/12-scale model of the inverted T AG(EH) main foil-strut assembly were determined for the foil oscillating in pitch in calm water and for the foil fixed in pitch heading into regular waves. In spite of the fact that the AG(EH) foil is cambered, tapered, and swept, its unsteady lift and hinge moment characteristics are in suprisingly close agreement with those predicted by two-dimensional theory if the horizontal component of the orbital wave velocity is included in the two-dimensional theory. (Author)

PAT-APPL-6-097 480 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Case Mounted Mooring System.
Patent Application,
Frank Peregrim, James B. Johnson, and Gerhard B. Winkler. Filed 26 Nov 79, 18p AD-D008 074/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A system is disclosed for mooring a buoyant case such as a marine mine or other marine device at a preselected depth below the surface of the water in which the case was launched. After the case has been launched, together with an attached anchor, the anchor and case separate to the extent of a resilient line as they descend through the water. When the case passes through a first preselected depth the resilient line is released from the case, thereby permitting a mooring line, which is connected in series between the resilient line and the case, to payout. As the mooring line unwinds the anchor descends to the ocean floor while the buoyant case ascends toward the surface. When the case ascends through a second preselected depth, a brake assembly is activated to stop the payout of the mooring line. After the case has been positioned at the second depth, a locking assembly fixes the position of the case at the mooring depth.

PB81-151599 PC **A09**/MF **A01**
Hydronautics, Inc., Laurel, MD.
A Mathematical Model for the Prediction of Impact Force Due to Ship Collision.
Final technical rept.,
Pin Yu Chang, and C. Thasanatorn. May 80, 187p TR-7923-1, MA-RD-940-80076A
Contract MA-79-SACB-0004

A mathematical model for the prediction of the collision impact force has been developed. The model is a synthesis of the collapse theorems, analytical methods for structural mechanics, and experimental data. This model has been validated by simulation of the bow models in the GKSS collision tests. It is also applied to the prediction of the collapse load of the bow of the U.S.C.G. icebreaker POLAR STAR.

PB81-152944 PC **A02**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
Opportunities for U.S. Flag Products and Chemical Tankers. Executive Summary.
Final rept. Sep 78-Sep 80,
S. W. Phillips, C. A. Steinbaum, D. P. Roseman, and M. C. Colen. Jan 81, 16p MA-RD-940-81002A
Contract DO-A01-78-00-3084
See also PB81-152951. Prepared in cooperation with Chem Systems, Inc., New York, Hydronautics, Inc., Laurel, MD., and Avondale Shipyards, Inc., New Orleans, LA.

Worldwide movements of products and chemicals will increase significantly in the next twenty years. U.S. shipments will decrease as a percentage world movements, but increase by over 10 million metric tons. U.S. domestic movements will remain static over the period. Presently, virtually all foreign trade in these commodities is carried in foreign flag ships. World P&C tanker fleets are projected to increase to match new volume requirements, but the U.S. flag fleet will decrease due to static volumes. Replacement and environmental regulations will drive new buildings rather than commodity volumes. U.S. shipyards, build only a small fraction of these ships--mostly product tankers. Although these ships offer a limited ownership opportunity to certain companies now, widespread ownership will depend on new legislative incentives.

PB81-152951 PC **A12**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
Opportunities for U.S. Flag Product and Chemical Tankers. Final Report (Includes Executive Summary).
Final rept. Sep 78-Sep 80,
S. W. Phillips, C. A. Steinbaum, D. P. Roseman, and M. C. Colen. Jan 81, 266p MA-RD-940-81002B
Contract DO-A01-78-00-384
See also Appendix A, PB81-152969. Prepared in cooperation with Chem System, Inc., New York, Hydronautics, Inc., Laurel, MD., and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 5 reports PC E99, PB81-152936.

The report dealing with product and chemical tanker markets, technology and economics is the result of a two phase project. Phase I involved research into relevant subject areas that are documented in this report and its supplements. Phase II involved contact and discussion with members of industries utilizing these ships -- chemical companies, oil companies, shipping companies, etc. This contact included briefings, review of written material and discussions as a means to create interest in U.S. constructed and operated product and chemical ships as well as to receive comment from industry planners regarding their opinions on subjects covered.

PB81-152969 PC **A08**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
Opportunities for U.S. Flag Product and Chemical Tankers. Appendix A. Commodity Demand and Projected Waterborne Shipments.
Final rept. Sep 78-Sep 80,
S. W. Phillips, C. A. Steinbaum, D. P. Roseman, and M. C. Colen. Jan 81, 165p MA-RD-940-81002C
Contract DO-A01-78-00-3084
See also Final Report, PB81-152951, and Appendix B, PB81-152977. Prepared in cooperation with Chem Systems, Inc., New York, Hydronautics, Inc., Laurel, MD., and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 5 reports PC E99, PB81-152936.

The Maritime Administration commissioned this study as part of its program to build up the bulk shipping sector of the U.S. Maritime industry. The stated objective of the study was to...'Investigate the market parameters and examine the technological and economic constraints for private industry to invest in and construct U.S. flag chemical and products carriers for both domestic and international trade.' Appendix A deals with commodity demand and projected waterborne shipments. Appendix A is organized in the following manner: Two major sections are included -- International Trade and Domestic Trade. Within the international trade section, Market data for each product and chemical studied is shown separately. The commodities are arranged in categories by type of ship transport. For each product or chemical, six sections are provided which deal with routes, supply/demand balances and waterborne movements by region. Domestic ocean movements are characterized by simpler route structures and commodity flows and projections are illustrated in route-oriented charts.

PB81-152977 PC **A04**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
Opportunities for U.S. Flag Product and Chemical Tankers. Appendix B. Ship Demand Projections and Fleet Profiles.
Final rept. Sep 78-Sep 80,
S. W. Phillips, C. A. Steinbaum, D. P. Roseman, and M. C. Colen. Jan 81, 53p MA-RD-940-81002D
Contract DO-A01-78-00-3084
See also Appendix A, PB81-152969, and Appendix C, PB81-152985. Prepared in cooperation with Chem Systems, Inc., New York, Hydronautics, Inc., Laurel, MD., and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 5 reports PC E99, PB81-152936.

This volume is part of the multi-volume report on U.S. flag chemical and products carriers for both domestic and international trade. Appendix B provides background ship demand material, a profile of current U.S. operators, and information pertaining to applicants for government aid that may have a bearing on ship demand.

PB81-152985 PC **A08**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
Opportunities for U.S. Flag Product and Chemical Tankers. Apendix C. Ship Demand Projections and Technology.
S. W. Phillips, C. A. Steinbaum, D. P. Roseman, and M. C. Colen. Jan 81, 167p MA-RD-940-81002E
Contract DO-A01-78-00-3084
See also Appendix B, PB81-152977, and Appendix D, PB81-152993. Prepared in cooperation with Chem Systems, Inc., New York, Hydronautics, Inc., Laurel, MD., and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 5 reports PC E99, PB81-152936.

This volume is part of the multi-volume report on U.S. flag chemical and products carriers for both domestic and international trade. Appendix C deals with the technology of product and chemical ships and includes the parametric design studies developed during the project.

PB81-152993 PC **A07**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
Opportunities for U.S. Flag Product and Chemical Tankers. Appendix D. Ownership and Financing and Projected Waterborne Shipments.
Final rept. Sep 78-Sep 80,
S. W. Phillips, C. A. Steinbaum, D. P. Roseman, and M. C. Colen. Jan 81, 136p MA-RD-940-81002F
Contract DO-A01-78-00-3084
See also Appendix C, PB81-152985. Prepared in cooperation with Chem Systems, Inc., New York, Hydronautics, Inc., Laurel, MD., and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 5 reports PC E99, PB81-152936.

This volume is part of the multi-volume report on U.S. flag chemical and products carriers for both domestic and international trade. Appendix D is comprised of financial studies of current ownership scenarios for three product and chemical ships.

PB81-155244 PC **A08**/MF **A01**
Logical Technical Services Corp., Vienna, VA.
A Study of Industrial Plant Vessel Applications for Select Sites.
Final rept. Mar 80-Jan 81,
B. K. Kwon, Jim Carroll, and Nancy Friedman. Jan 81, 168p MA-RD-940-81036
Contract MA80-SAC-01016

The report describes various potential and actual industrial plant vessels (IPVs) which could be constructed and put into manufacturing processes in U.S. Among these IPVs, four IPVs were selected for further evaluation utilizing a series of selection processes. These IPVs are: Coal Blending and Storage, Grain Processing, Methanol/Urea Conversion and Manganese Nodule Processing. Economic and technical assessment of these IPVs are made to evaluate the potential viability of construction and introduction of the IPVs at specific site suitable for U.S.

PB81-858847 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Shipbuilding Materials. January, 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Jan 81.
Jan 81, 165p

This bibliography contains information on various shipbuilding materials for inside and outside structures. Various assembly techniques are also discussed. (Contains 176 citations, fully indexed and including a table of contents.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-906 185/4 PC **A02**/MF **A01**
General Electric CO San Jose Calif
Investigation of Acoustic Emission from Simulated Reactor Primary Piping under Dynamic Stress Testing.
Technical information series,
R. R. Witek. Dec 68, 15p Rept nos. NEDE-10146, 70NED4
Distribution limitation now removed.

The acoustic emission investigation was successful in that waveform energy, identified as originating under stress at the crack zone, was detected. Equipment, methods, and techniques were developed to detect, record, and analyze the waveform energy. Raw and filtered waveform data were presented on an oscilloscope screen and photographed. (Author)

DOE/METC/SP-80/17 PC **A03**/MF **A01**
TRW Energy Systems Planning Div., Morgantown, WV.
Everlasting Sliding-Disc Valve. METC SOA Test Valve No. B-3, State-of-the-ART Lockhopper Valve Testing and Development Project. Summary Test Report.
J. F. Gardner, R. C. Hall, R. G. Hornbeck, R. A. Griffith, and T. M. Yost. Aug 80, 42p
Contracts AM21-80MC15422, AT21-80MC14689

The Everlasting Sliding-Disc Valve (METC SOA Test Valve No. B-3) accumulated 740 valve cycles in the Valve Static Test Unit and over 16,000 valve cycles in the Valve Dynamic Test Unit. Only minor operating problems, primarily erratic motion and some scoring of the seating surface, where encountered with coarse limestone (5/16" x 1/8") particles. Operation with fine solids (100-mesh limestone) showed excellent performance. The actuator level arm failed twice but a change in clearances solved the problem. Based on its performance in testing, the Everlastinc Sliding-Disc Valve, with minor modifications, is a very promising choice for feedside lockhopper service in coal conversion and utilization. (ERA citation 06:005655)

DOE/METC/SP-80/25 PC **A04**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Everlasting Double-Disc Coke-Oven Valve METC SOA Test Valve No. A-8 State-of-the-ART Lockhopper Valve-Testing and Development Project. Summary Test Report.
J. F. Gardner, R. C. Hall, R. G. Hornbeck, R. A. Griffith, and T. M. Yost. Sep 80, 54p

The Everlasting Double-Disc Coke-Oven Valve (METC SOA Test Valve No. A-8) accumulated 628 cycles in the Valve Static Test Unit and 8893 cycles in the Valve Dynamic Test Unit. The test valve performed satisfactorily during the ambient and 300 exp 0 F operating temperature static tests. Some design modifications were required to successfully complete the tests at 600 exp 0 F temperature. During dynamic testing, the valve leakage rates and wear rates were within acceptable limits after 8500 cycles using limestone as the test medium. However, when the medium was changed to aluminum oxide, the valve suffered severe damage by abrasive scoring of all the seating surfaces. Further testing was cancelled. The overall test data for the test valve show favorable results. The valve offers a solid basic design from which a successful multi-purpose lockhopper valve could be developed. It offers ease of fabrication and maintenance, and with some modifications, could be a very promising valve choice for lockhopper applications. (ERA citation 06:005656)

PATENT-4 184 662 Not available NTIS
Department of Energy, Washington, DC.
Valve for Controlling Solids Flow.
Patent,
D. K. Feldman. Filed 25 Jul 78, patented 22 Jan 80, 6p PAT-APPL-927 806
Supersedes PAT-APPL-927 806-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fluidized solids control valve is disclosed that is particularly well adapted for use with a flow of coal or char that includes both large particles and fines. The particles may or may not be fluidized at various times during the operation. The valve includes a tubular body that terminates in a valve seat covered by a normally closed closure plate. The valve body at the seat and the closure plate is provided with aligned longitudinal slots that receive a pivotally supported key plate. The key plate is positionable by an operator in inserted, intermediate and retracted positions respecting the longitudinal slot in the valve body. The key plate normally closes the slot within the closure plate but is shaped and aligned obliquely to the longitudinal slot within the valve body to provide progressively increasing slot openings between the inserted and retracted positions. Transfer members are provided between the operator, key plate and closure plate to move the closure plate into an open position only when the key plate is retracted from the longitudinal slot within the valve body. (ERA citation 06:006372)

PATENT-4 193 422

Not available NTIS

Department of Energy, Washington, DC.
Annular Flow Diverter Valve.
Patent,
R. L. Rider. Filed 24 Nov 78, patented 18 Mar 80, 4p PAT-APPL-963 654
Supersedes PAT-APPL-963 654-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A valve is described for diverting flow from the center of two concentric tubes to the annulus between the tubes or, operating in the reverse direction, for mixing fluids from concentric tubes into a common tube and for controlling the volume ratio of said flow. It consists of a toroidal baffle disposed in sliding engagement with the interior of the inner tube downstream of a plurality of ports in the inner tube, a plurality of gates in sliding engagement with the interior of the inner tube attached to the baffle for movement therewith, a servomotor having a bullet-shaped plug on the downstream end thereof, and drive rods connecting the servomotor to the toroidal baffle. The sevomotor is adapted to move the baffle into mating engagement with the bullet-shaped plug and simultaneously move the gates away from the ports in the inner tube and to move the baffle away from the bullet-shaped plug and simultaneously move the gates to cover the ports in the inner tube. (ERA citation 06:006368)

PATENT-4 195 813

Not available NTIS

Department of Energy, Washington, DC.
Valve.
Patent,
N. Cho. Filed 15 May 72, patented 1 Apr 80, 4p PAT-APPL-253 260
Supersedes PAT-APPL-253 260-72.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A positive acting valve suitable for operation in a corrosive environment is provided. The valve includes a hollow valve body defining an open-ended bore for receiving two, axially aligned, spaced-apart, cylindrical inserts. One insert, designated the seat insert, terminates inside the valve body in an annular face which lies within plane normal to the axis of the two inserts. An elastomeric O-ring seal is disposed in a groove extending about the annular face. The other insert, designated the wedge insert, terminates inside the valve body in at least two surfaces oppositely inclined with respect to each other and with respect to a plane normal to the axis of the two inserts. An elongated reciprocable gate, movable between the two inserts along a path normal to the axis of the two inserts, has a first flat face portion disposed adjacent and parallel to the annular face of the seat insert. The gate has a second face portion opposite to the first face portion provided with at least two oppositely inclined surfaces for mating with respective inclined surfaces of the wedge insert. An opening is provided through the gate which registers with a flow passage through the two inserts when the valve is open. Interaction of the gate against the O-ring seal in the seat insert at the limits of gate displacement where it reaches its respective fully open and fully closed positions. (ERA citation 06:005168)

PB81-858839 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fuel Pump Applications. January, 1972-January, 1981 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Jan 81.
Jan 81, 84p

This bibliography contains information on design, construction, and applications of fuel pumps for diesel fuel, gasoline, and liquid gases. Pressure distribution and constant flow control in pipelines and applications to various types of engines are also discussed. (Contains 79 citations, fully indexed and including a table of contents.)

PB81-859282 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vacuum Pumps. January, 1976-January, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jan 81.
Jan 81, 177p

This bibliography covers information on design, construction, and applications of vacuum pumps in industrial commercial, and space technology. Topics include energy conservation, ultra-high vacuum pumps and turbomolecular pumps. (Contains 185 citations, fully indexed and including a table of contents.)

PB81-859308 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vacuum Pumps. January, 1972-January, 1981 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Jan 81.
Jan 81, 112p

This bibliography covers information on design, construction, and applications of vacuum pumps in industrial, commercial and space technology. Topics include energy conservation, ultra-high vacuum pumps and turbomolecular pumps. (Contains 109 citations, fully indexed and including a table of contents.)

13L. Safety Engineering

AD-889 022/0 PC **A06**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Drag and Performance Characteristics of Several Rigid Aerodynamic Decelerators at Mach Numbers from 1.5 to 6.
Final technical rept. 25 Mar-9 Apr 71,
R. W. Rhudy, and J. H. Jones. Nov 71, 106p
Rept no. AEDC-TR-71-233
Contract F40600-72-C-0003
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn. Rept. no. ARO-VKF-TR-151.
Distribution limitation now removed.

Static-force tests were conducted at Mach numbers from 1.5 through 6 on rigid models of a supersonic X-2 parachute and two conical decelerators in the wake of cone-cylinder and ejection-seat forebodies. Surface pressure data were also obtained on the conical decelerators. The tests were made at decelerator angles of attack from -8 to 8 deg at free-stream dynamic pressures of 0.5, 1.0, 1.5, and 2.0 psia. The decelerators were positioned at various axial stations in the forebody wake, and selected configurations were tested in the free stream (no forebody). The data presented show how a rigid model of a flexible parachute can be used to obtain performance data in terms of static stability and drag coefficients. Agreement was obtained in axial-force coefficient for a rigid parachute model with a previously tested flexible model of the same configuration deployed behind the same forebody.

PB81-151870 PC **A04**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Mobile Home Research: Full-Scale Fire Tests on Specific Wall and Ceiling Materials of Mobile Home Modules.
Test rept.
Jan 80, 72p HUD-0001834, HUD/PDR-635
Contract HUD-H-2649

The research report presents the results of a series of modified full-scale fire tests that were conducted on mobile home modules constructed with various interior finish materials. The report was designed to provide HUD with comprehensive data on the characteristics of fire growth and spread that could be compared with other information on full-size mobile home tests. The evaluations were based on the burning characteristics of the materials when exposed to a fire resulting from the ignition of a 6.4 kg (14-lb) wood crib in a corner configuration. A review of the burning characteristics and analysis of the products of combustion under this set of test conditions found that the fire safety performance was most favorable in the case of the module constructed with 5.16-inch gypsum board, printed paper overlay (F.S. of 15) walls and ceiling. In addition, both types of 5/32-inch Lauan plywood wall materials (prefinished, intumescent coated and standard coated) showed no significant differences in ignitability and both contributed to fire growth. Five figures, 12 tables, and footnotes are included. Metric equivalents, chronological tabulation of test observations, temperature profiles, and gas analysis, smoke generation, and weight loss data are included.

PB81-803355 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Roads and Runways: Snow Removal and Deicing Techniques. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Feb 81, 235p
Supersedes PB80-803372, and NTIS/PS-78/1284.

The bibliography covers research reports on materials, maintenance, costs, corrosion inhibition, pollution, and the planning applied to snow and ice removal. Applications cover bridges and railroads as well as highways and runways. (This updated bibliography contains 230 citations, 7 of which are new entries to the previous edition.)

13M. Structural Engineering

PB81-148108 PC **A08**/MF **A01**
Pittsburgh Univ., PA. Dept. of Civil Engineering.
Dynamic Analysis of Electric Transmission Line Systems with Broken Wires,
John F. Fleming, and Faruq Siddiqui. Sep 80, 172p SETEC-CE-80-035, NSF/RA-800306
Grant NSF-PFR77-23519

A study is reported of the behavior of electric transmission line systems when one or more of the wire suddenly breaks. Special attention focused on the variation with time of the longitudinal unbalanced loads in the system to determine maximum values for design of the support structures. The investigation comprised three parts: (1) broken wire analysis; (2) development of a computer program for dynamic analysis; and (3) design of transmission line systems for broken wires. The computer program performs a dynamic analysis of a general line system after any number of wires are broken. A lumped mathematical model was used and nonlinear equations of motion were solved using two different numerical analysis procedures. The nonlinearity of the system is due to the nonlinear sag-tension relationship for the suspension insulators. A preliminary parametric study shows that dynamic loads and ground line moments which are more than four times the residual static values can be expected in typical line systems.

PB81-154726 PC **A07**/MF **A01**
California Univ., Los Angeles. Dept. of Mechanics and Structures.

Interpretation of Strong-Motion Earthquake Records Obtained in and/or Near Buildings, Proceedings of a Workshop Held at San Francisco, California on April 1-2, 1980,
Gary C. Hart, Christopher Rojahn, and J. T. P. Yao. Apr 80, 137p UCLA-ENG-8015, NSF/RA-800384
Grant NSF-PFR79-08980

Existing building strong-motion earthquake instrumentation programs are reviewed and summarized. Specific aspects discussed include building instrumentation programs, current strong-motion ground record processing, utilization of strong-motion records in building design, and information obtained from strong-motion records. Procedures for processing and interpreting data from existing programs are documented. New methods are identified to improve data acquisition analysis and interpretation techniques. Recommendations address fundamental policy, specific technical aspects of instrumentation, data processing, and research needs. The report includes extensive references, the workshop program and its participants, and brief written presentations.

PB81-169468 PC **A09**/MF **A01**
Johns-Manville Sales Corp., Denver, CO. Research and Development Center.
Development of Lead Based Paint Hazard Abatement System Using Laminated Wall Covering and Adhesive Systems. System A.
31 Jan 80, 181p HUD-0001565
Contract HUD-H-2567

This report describes the component selection studies for the wall - covering system, known as System A, that was developed for lead - paint hazard abatement. Detailed performance test data, installation test work, projected costs, and action needed to achieve a commercially available System A are given. The components of the system are a wall covering consisting of a factory - laminated, coated wallpaper and fiberglass mat. A barrier adhesive saturates the fiberglass mat and provides the bond to the wall surface. A strippable feature is built into the system to provide further lead - paint hazard protection. When numerous combinations of wall coverings and fiber glass mat were evaluated, the most promising combination was a polyethylene - coated, 59 - pound - per - ream, bleached kraft paper laminated to a 1.4 - pound - per - 100 - square - foot fiber glass mat. The most acceptable barrier adhesive found when considering system performance, application methods, and environmental conditions was the J. G. Milligan and Co. 12 - 225 barrier adhesive. The system, as designed with these components, has the desired strippability feature and provides a good barrier to lead - based paint. Contract information and company correspondence are appended; an article on fibrous glass and tables also appears. (Author abstract modified).

PB81-169476 PC **A09**/MF **A01**
Urban Inst., Washington, DC.
Development of Lead Based Paint Hazard Abatement System Using Laminated Wall Covering and Adhesive Systems. System B.
31 Jan 80, 176p HUD-0001566
Contract HUD-H-2567

This report describes the component selection studies for the wall - covering system known as System B. System B was developed for the purpose of lead paint hazard abatement. Detailed performance test data, installation test work, projected costs, and action needed to achieve a commercially available system are given. The components of the system consist of (1) J. G. Milligan and Co. 12 - 209 penetrating adhesive, which will strengthen and stabilize weak surfaces by rebonding loose paint and wallpaper to the wall surface; (2) flame - laminated fiberglass mat / low density urethane foam wall covering applied with the foam side of the laminate adhered to the wall surface with the same penetrating adhesive; and (3) a texture paint coating applied to the fiberglass mat surface by means of a hopper gun. The Milligan 12 - 209 penetrating adhesive should be useful not only with this covering system but also with other covering systems for lead - based paint abatement. Part of its effectiveness is due to the strong film it forms over the surface. The foam component of the laminate makes it practical to apply the system over rough or uneven surfaces and achieve a good bond. An alternate covering system, consisting of a cementitious coating or a textured paint coating, was partially developed but was dropped from consideration as an adequate barrier to lead - based paint. Contract information, tables, articles on fibrous glass, and photographs are included. (Author abstract modified).

PB81-169492 PC **A07**/MF **A01**
Johns-Manville Sales Corp., Denver, CO. Research and Development Center.
Fiber Glass Mat/Mechanical Fastener Covering System. Volume B: Field Tests of the System and Wall Repair Techniques.
03 Apr 79, 143p HUD-0001568
Contract HUD-H-2261R

Techniques for applying a fiber glass mat / mechanical fastener covering system under varying conditions of disrepair are described. Results of system field tests are reported. The Fiber Glass Mat Covering System consists of a wall repair technique that uses quick - setting, low - shrinkage joint compound for patching, in conjunction with a self - drilling, screw - washer system or with staples to reinforce or refasten weak or loose plaster. The repaired wall is then covered with a fiber glass barrier that is applied using an adhesive topcoated with a second application. Techniques and equipment necessary to prepare interior walls prior to the application of the fiber glass mat covering are reviewed. Guidance is given for substrata and surface appearance repairs. Application techniques are described for the original two - part adhesive system. The field development of wall application techniques and field tests of the modified system (use of an adhesive consisting of one part of Hadley No. 1181 adhesive and three parts of a water base primer paint instead of the original crosslinking, two - part Duro - Lok adhesive) are described. General objectives of the tests were to assess the effectiveness of the techniques in abating the lead - base paint hazard on walls covered and in reducing air infiltration through walls in order to increase energy conservation. Results of the field testing were generally favorable. The appendix contains product specifications and details.

PB81-169849 PC **A05**/MF **A01**
Woodrow Wilson International Center for Scholars, Washington, DC.
Soviet Housing and Urban Design,
Steven A. Grant. Sep 80, 77p HUD-0001759, HUD/IA-595
Grant HUD-H-5108G

The 11 papers in this volume were originally prepared for a conference on Soviet housing and urban design held Dec. 9, 1979, and cosponsored by HUD. This publication is designed to present the technical observations and findings of the participants of the U.S. - U.S.S.R. Agreement on Cooperation in the Field of Housing and Other Construction. This collection provides papers of each of six working group members, accompanied by presentations by American Scholars, whose fields of expertise complement the more technical topics. With one exception, selected issues in Soviet construction and urban development are discussed from two different perspectives. Subjects covered include (a) the centralization and standardization of Soviet urban planning and construction; (b) the current situation and future prospects of Soviet cities, especially new towns; (c) socioeconomic aspects of city life, particularly housing; and (d) technical and practical achievements of Soviet construction. Among the recurrent and most important themes discussed, the paramount one concerns Soviet attempts to standardize the construction industry. Soviet efforts to overcome shortages and inferior past performane with better planning, design, and construction techniques are examined. Centralization as the price paid for standardization and long - range planning is highlighted. Two reforms, the Zlobin and Orel methods, designed to overcome the paucity of local initiatives, are discussed. Other topics covered include the Moscow real estate market and Soviet construction potential. Maps, photographs, reference notes, and references are included. (Author abstract modified).

14.

METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A093 591/6 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Evaluation of a Subsonic Cascade Wind Tunnel for Compressor Blade Testing.
Master's thesis,
David A. DuVal. Sep 80, 86p

Development of the subsonic cascade wind tunnel facility required determination of the two-dimensionality and periodicity of the airflow in the test section with test cascade installed. Data acquisition procedures were developed and data were recorded for two facility configurations. The flow was shown to be unsatisfactory at a diffusion factor of approximately 0.58 and aspect ratio 1.25, and to be acceptably two-dimensional and periodic at a diffusion factor of approximately 0.39 and aspect ratio 1.95. (Author)

AD-A093 596/5 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Thermal Strain Measurement by One-Beam Laser Speckle Interferometry,
Fu-Pen Chiang, Robert F. Anastasi, John F. Beatty, and Jiro Adachi. 23 Feb 80, 13p Rept no. AMMRC-TR-80-51
Pub. in Applied Optics, v19 n16, p2701-2702, 15 Aug 80.

No abstract available.

AD-A093 722/7 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Skin-Friction Measurements at Subsonic and Transonic Mach Numbers with Embedded-Wire Gages.
Final rept. Oct 78-Mar 80,
D.W. Sinclair. Jan 81, 47p Rept no. AEDC-TR-80-29
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Embedded-wire skin-friction gages were tested in the Acoustic Research Tunnel (ART) and on a model in Tunnel 16T at AEDC. The range of Mach numbers and Reynolds numbers considered was typical of the conditions encountered in transonic wind tunnel testing. Data obtained by the embedded-wire technique agreed well with data from conventional methods of measuring skin friction when the gages were calibrated in situ. When the gages were calibrated and reinstalled at a later data, the calibration coefficients could not be corrected by simple techniques. (Author)

AD-A093 797/9 PC **A08**/MF **A01**
Hughes Aircraft Co., Fullerton, CA. Ground Systems Group.
Manufacturing Methods and Technology for Digital Fault Isolation of Printed Circuit Boards.
Final rept. Sep 79-Oct 80.
15 Nov 80, 170p Rept no. HAC-FR-80-12-975
Contract DAAK40-78-C-0290

This report presents the final recommendations and conclusions, with supporting data, resulting from the contract option phase of contract DAAK40-78-C-0290. It describes the manufactur-

ing technology and test system that will enable detection, identification, and location of digital faults in the advanced missile electronic systems that will be used in the 1980's. Emphasis is placed on the fault diagnosis of large printed circuit boards containing complex hybrid digital microelectronic circuits. The Basic Effort included an industry survey for digital printed circuit board test requirements and available test system capabilities, the D/PCB testability investigation and resulting design guide, the development of digital fault isolation methodology and the comprehensive selection of the optimum ATE that recommended the DTS-70 system. The contract option phase of this project involved the purchase and installation of the DTS-70 system, the selection of the PN-1635972 and the PN-1646178 D/PCBs for testing, the development of generalized test software and the development of the specific hardware and software needed to test these worst-case boards. (Author)

AD-A093 918/1 Not available NTIS
Princeton Univ., NJ. Applied Physics and Materials Labs.
Elimination of Dispersion-Induced Distortion in Infrared Absorption Spectra by Use of Photoacoustic Spectroscopy,
G. Laufer, J. T. Huneke, B. S. H. Royce, and Y. C. Teng. 26 Mar 80, 5p ARO-16865.3-C
Contract DAAG29-80-C-0053
Availability: Pub. in Applied Physics Letters, v37 n6 p517-519, 15 Sep 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 929/8 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Laser Scattering Applications Development Test in AEDC Tunnel B at Mach Number 8.
Final rept.,
W. T. Strike, and L. L. Price. Mar 80, 51p Rept no. AEDC-TSR-80-V16
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Free stream and local flow field measurements on a blunt (0.375-in. radius) nose 5-deg cone were made in Tunnel B at Mach number 8. The nonintrusive flow field measurements were made using various laser scattering optical systems to determine the free stream and local flow field particulate concentration and size distribution, the nitrogen molecule number density, and the local stream velocity using a Fabry-Perot interferometer system. The 5-deg cone pressure distributions were used to confirm the test section Mach number and to produce a known local flow field which could be used to demonstrate potentially useful laser scattering measuring techniques. (Author)

AD-A093 940/5 PC **A03**/MF **A01**
Naval Coastal Systems Center, Panama City, FL.
Calibration of Sonic Flowmeters for Ocean Thermal Energy Conversion (OTEC).
Technical memo.,
D. F. Lott, G. G. Salsman, and C. E. Hodges. Dec 80, 35p Rept no. NCSC-TM-295-80
Contract ET-78-I-01-3218

Scientists at the Naval Coastal Systems Center (NCSC) at Panama City, Florida, have used a commercially available acoustic flowmeter to monitor critical flow conditions during an OTEC (Ocean Thermal Energy Conversion) funded study of the effects of biofouling on the efficiency of a prototype heat transfer system. Flowmeters of this type are particularly useful in applications requiring unimpeded flow; i.e., no sensor projecting into the moving fluid. Unfortunately, sonic flowmeters are somewhat difficult to calibrate and may be subject to drift. A method of calibration devised by NCSC may thus be of some interest to other users. It is the purpose of this report to document the special procedures used by test personnel to calibrate the flowmeters. Briefly, the calibration consisted of pumping sea water through the flowmeter into a tank suspended beneath a special load cell which provided an output voltage proportional to the weight of water in the tank. A programmable desktop calculator system was used to monitor changes in voltage as a function of time, and convert these changes into flow rates for direct comparison with values read from the sonic flowmeter's digital display. Calibration checks were made at metered flows of 8, 10, 12, 14, 16, and 18 gallons per minute (gpm). It was found that computed flows were essentially linear but differed from metered values by as much as 9.0 percent.

AD-A093 957/9 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Evaluation of the Acoustic and Aerodynamic Characteristics of Several Slot-Baffle Configurations for Transonic Wind Tunnel Walls.
Final rept. 20 Oct-15 Nov 78,
J. L. Jacocks, D. W. Sinclair, and R. L. Parker Jr. Jan 81, 49p Rept no. AEDC-TR-79-59
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

An experimental investigation was conducted to record the acoustic and aerodynamic performance of several slotted walls with transverse baffles in the slots for transonic test sections. Primary configuration variables were the baffle angle inclination relative to the airstream and a wire mesh screen on the airside wall surface. At all baffle angles, the addition of the screen overlay decreased the acoustic noise level and improved the flow generation and supersonic wave cancellation properties of the wall but increased the subsonic wall interference effects. (Author)

AD-A093 973/6 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Evaluation of Critical Sting Length on a 7-deg Cone as Determined by Measurements of Dynamic Stability Derivatives and Base Pressure for Mach Numbers 0.2 through 1.3.
Final rept.,
Fred B. Cyran, Bob L. Uselton, and Ed J. Marquart. Jan 81, 60p Rept no. AEDC-TR-80-17
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Wind tunnel tests were conducted to provide sting-support interference information for planning and directing wind tunnel tests at subsonic and transonic Mach numbers. Sting-length effects on dynamic stability derivatives, static pitching moment, and base pressure of a blunt, flat-base 7-deg cone were investigated at Mach numbers 0.2 to 1.3 in the Arnold Engineering Development Center (AEDC) Propulsion Wind Tunnel Facility (PWT). Two frequencies of oscillation, nominally 5.3 and 2.9 Hz, were investigated. The boundary-layer state at the model base was turbulent for all Mach numbers greater than 0.2. The interference effects of two types of model-wake splitter plates were also investigated. The results showed that the critical sting length depended on the Mach number, angle of attack, and type of data used as the interference indicator. A critical sting length of three model diameters was determined to be suitable for all test conditions for the ratio of sting-diameter-to-model-base-diameter (0.22) for this test. (Author)

AD-361 922/8 PC **A03**/MF **A01**
Sandia Corp Albuquerque N Mex
Instrumentation for Projects 1.2A, 1.3, and 1.7
R. H. Thompson. Jan 45, 42p AEC-WT-907
Report on Operation Castle (U).
Distribution limitation now removed.

This is a report on the instrumentation for Projects 1.2a, 1.3, and 1.7 of Operation CASTLE. This instrumentation was devised to measure pressures, shock winds, and ground accelerations from large scale detonations. Project 1.2a measured pressures less than 75 psi, Project 1.3 recorded shock winds, and Project 1.7 was concerned with close-in ground accelerations. In addition to the formal instrumentation program field tests of several new type gages were made. All new gages had had laboratory tests but field tests were made to insure that the gages would perform under actual operating conditions. Records were taken on 112 information channels. Of these, 99 gave good information, six gave information up to arrival of the shock wave and seven gave no information. (Author)

N81-14982/5 PC **A02**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Performance of the University of Toronto Infrasizer MK 3 as a Monosizer and Multi-Cut Classifier.
A. H. Vonflotow, and B. Etkin. Dec 80, 25p UTIAS-TN-227

For free-flowing spherical particles in the range tested (50 to 230 micrometers), the performance, both as a multi-cut device and in monosize production, is excellent. The sharpness of cut index is only a few percent higher than the ideal value of 1.00 and monosize fractions can be produced with standard deviation about 4% of the average diameter.

N81-15038/8 PC **A02**/MF **A01**
Southampton Univ. (England).
Electromagnet Configurations for Extreme Attitude Testing in Magnetic Suspension and Balance Systems.
Semiannual Progress rept.,
C. P. Britcher. Dec 80, 22p NASA-CR-163862
Grant NSG-7523

The inclusion of adequate versatility into the electromagnet array configuration requires sizing the electromagnets to satisfy particular absolute force and moment requirements. Magnetic performance of a permanent magnet model core, air cored electromagnet may easily and reliably be computed by using the FORCE program which calculates model forces and moments via representations of the model as an assembly of dipoles and the electromagnets as an assembly of line currents. Some aspects of the performance of an ellipsoidal iron cored model may be inferred from the above under certain circumstances.

PAT-APPL-6-058 339 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Apparatus for Measuring the Local Void Fraction in a Flowing Liquid Containing a Gas.
Patent Application,
P. F. Dunn. Filed 17 Jul 79, 15p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The local void fraction in liquid containing a gas is measured by placing an impedance-variation probe in the liquid, applying a controlled voltage or current to the probe, and measuring the probe current or voltage. A circuit for applying the one electrical parameter and measuring the other includes a feedback amplifier that minimizes the effect of probe capacitance and a digitizer to provide a clean signal. Time integration of the signal provides a measure of the void fraction, and an oscilloscope display also shows bubble size and distribution. (ERA citation 06:006400)

PAT-APPL-6-064 594 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Self-Modulating Pressure Gauge.
Patent Application,
D. Edwards, Jr., and C. P. Lanni. Filed 7 Aug 79, 10p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An ion gauge is disclosed having a reduced x-ray limit and means for measuring that limit. The gauge comprises an ion gauge of the Bayard-Alpert type having a short collector and having means for varying the grid-collector voltage. The x-ray limit (i.e. the collector current resulting from x-rays striking the collector) may then be determined by the formula: I/sub x/ = alpha I/sub I/ - I/sub h// alpha - I where: I/sub x/ = x-ray limit, I/sub I/ and I/sub h/ = the collector current at the lower and higher grid voltage respectively; and, alpha = the ratio of the collector current due to positive ions at the higher voltage to that at the lower voltage. (ERA citation 06:006403)

PATENT-4 181 882
Not available NTIS
Department of Energy, Washington, DC.
Corrosion Monitoring Apparatus.
Patent,
H. S. Isaacs, and J. R. Weeks. Filed 19 Jan 78, patented 1 Jan 80, 12p PAT-APPL-916 624

Supersedes PAT-APPL-916 624-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A corrosion monitoring device in an aqueous system is disclosed which includes a formed crevice. The corrosion of the surfaces forming the crevice is monitored by the use of an ac electrical signal. (ERA citation 06:006272)

PATENT-4 189 944
Not available NTIS
Department of Energy, Washington, DC.
Hydrodynamic Ultrasonic Probe.
Patent,
R. A. Day, and A. E. Conti. Filed 3 Nov 78, patented 26 Feb 80, 4p PAT-APPL-957 620
Supersedes PAT-APPL-957 620-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved probe for in-service ultrasonic inspection of long lengths of a workpiece, such as small diameter tubing from the interior, utilizes a conventional transducer or transducers configured to inspect the tubing for flaws and/or wall thickness variations. The probe utilizes a hydraulic technique, in place of the conventional mechanical guides or bushings, which allows the probe to move rectilinearly or rotationally while preventing cocking thereof in the tube and provides damping vibration of the probe. The probe thus has lower friction and higher inspection speed than presently known probes. (ERA citation 06:006402)

PATENT-4 196 353
Not available NTIS
Department of Energy, Washington, DC.
Microradiographic Microsphere Manipulator.
Patent,
R. M. Singleton. Filed 24 Jan 79, patented 1 Apr 80, 6p PAT-APPL-6-005 948
Supersedes PAT-APPL-6-005 948.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and apparatus are provided for radiographic characterization of small hollow spherical members (microspheres), constructed of either optically transparent or opaque materials. The apparatus involves a microsphere manipulator which holds a batch of microspheres between two parallel thin plastic films for contact microradiographic characterization or projection microradiography thereof. One plastic film is translated to relative to and parallel to the other to roll the microspheres through any desired angle to allow different views of the microspheres. (ERA citation 06:005190)

PATENT-4 196 613
Not available NTIS
Department of Energy, Washington, DC.
Device for Measuring the Fluid Density of a Two-Phase Mixture.
Patent,
J. H. Cole. Filed 30 Nov 78, patented 8 Apr 80, 8p PAT-APPL-957 618
Supersedes PAT-APPL-957 618-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device for measuring the fluid density of a two-phase mixture flowing through a tubular member is described. A rotor assembly is rotatively supported within the tubular member so that it can also move axially within the tubular member. The rotor assembly is balanced against a pair of springs which exert an axial force in the opposite direction upon the rotor assembly. As a two-phase mixture flows through the tubular member it contacts the rotor assembly causing it to rotate about its axis. The rotor assembly is forced against and partially compresses the springs. Means are provided to measure the rotational speed of the rotor assembly and the linear displacement of the rotor assembly. From these measurements the fluid density of the two-phase mixture is calculated. (ERA citation 06:005188)

PB81-145922 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
NBS Dimensions, Volume 64, Number 9.
Nov 80, 33p NBS/DIM-64-9
See also Volume 64, Number 7, PB81-113201.

Contents:
Putting it all together--Alaskan pipeline weld criteria;
Testing without destruction--Nondestructive evaluation techniques;
Progress toward a new scale of temperature;
New Raman microprobe with multichannel detectors;
Kinetic data base for atmospheric chemistry;
Breakdown between bare electrodes;
Optical nondestructive evaluation;
Trace elements in water.

PB81-155053 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
The Continuously Operating Perfluorocarbon Sniffer (COPS) for the Detection of Clandestine Tagged Explosives.
Informal rept.,
Russell N. Dietz, and Robert W. Goodrich. May 80, 25p BNL-28114
Contract DE-AC02-76CH00016
Sponsored in part by Bureau of Alcohol, Tobacco and Firearms, Washington, DC.

An instrument has been designed and tested for the purposes of continuously detecting low concentrations of perfluorocarbon compounds in the air. By continuously mixing a compressed stream of sampled air with about half as much hydrogen, passing the mixture through a heated Pd catalyst bed for conversion of the oxygen to steam, and subsequent drying in a continuous counter-current permeation dryer, the effluent gas can be directly monitored in an electron capture detector for the presence of perfluorocarbon compounds at levels down to a few ppt. A description of the instrument is presented along with its typical performance specifications. The Continuously Operating Perfluorocarbon Sniffer (COPS) has been shown to be successful in the screening of baggage at airport environments for the detection of clandestine perfluorocarbon-tagged explosives.

PB81-802522 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing: X-Ray Photography and Radiography. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 319p
Supersedes PB80-802192, and NTIS/PS-78/1058.

Federally-sponsored research and foreign reports covering techniques, equipment, and applications are cited. Applications include flaw detection, fatigue determination, inspection of joints, and measurement of mechanical and physical properties. Medical and biological applications are excluded. (This updated bibliography contains 315 citations, 37 of which are new entries to the previous edition.)

PB81-802530 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing: X-Ray Photography and Radiography. August, 1976-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Aug 76-Dec 80.
Jan 81, 264p
Supersedes PB80-802200, and NTIS/PS-78/1059. See also 1970-July, 1976, NTIS/PS-77/0909.

The bibliography cites reports from worldwide research covering techniques, equipment, and applications. Applications include flaw detection, fatigue determination, inspection of joints, quality control, and measurement of mechanical and physical properties. Medical and biological applications are excluded. (This updated bibliography contains 260 citations, 28 of which are new entries to the previous edition.)

PB81-803488 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Fatigue Testing Machines. 1973-January, 1981 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Jan 81.
Jan 81, 42p
Supersedes PB80-804057. Sponsored by National Technical Information Service, Springfield, VA.

These citations from the international literature compress summaries of the design, operations, and performance of fatigue testing machinery including control systems, components, and diagnostic equipment. Application to metal alloys, composites, and polymers under conditions varying from cryogenic to high temperature, and vacuum to greater than 1000 MPA are described. Types of fatigue that are investigated are those due to thermal and corrosion stresses, as well as stresses arising from fretting, flexure, and impact. (This updated bibliography contains 180 citations, 29 of which are new additions to the previous edition.)

PB81-859472 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Wind Tunnels. January, 1976-January, 1981 (Citations from the Energy Data Base).
Rept. for Jan 76-Jan 81.
Jan 81, 213p

This bibliography covers information on wind tunnel testing of aircraft, buildings, mobile homes, aircraft engines, automobiles, stadium roofs, windmills, and bridge road decks. Topics include air pollution, atmospheric studies, and friction velocity at both subsonic and supersonic speeds. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-859498 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Wind Tunnels. January, 1972-January, 1981 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Jan 81.
Jan 81, 89p

This bibliography covers information on wind tunnel testing of aircraft, buildings, mobile homes, aircraft engines, automobiles, stadium roofs, windmills, and bridge road decks. Topics include air pollution, atmospheric studies, and friction velocity at both subsonic and supersonic speeds. (Contains 75 citations, fully indexed and including a table of contents.)

14C. Recording Devices

AD-044 780/5 PC **A03**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Preliminary Evaluation of a Miniature Portable Wire Recorder for Countermeasures Applications
COSIMO TESTA. Jun 54, 26p Rept no. tm1572
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

N81-15341/3 PC **A02**/MF **A01**
Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (Germany F.R.).
A Method for Displaying Power-Density Spectra on Gray Chart Recorders.
K. Rosenbach. Jan 80, 21p REPT-1-80
Contract BMVG-GF-79
In German; English Summary.

A number of nonlinear signal processing procedures to be used for dynamic range compression of data for display on gray chart recorders are listed. A formula is presented which allows calculation in terms of dynamic range matching of the optimal window width.

PB81-850661 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Entertainment Appliances: Home and Commercial Video Tape Recorders. January, 1970-September, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Sep 80.
Sep 80, 171p

The citations cover worldwide information on video tape recorders. Various applications of video recording systems and magnetic tapes are also included. (Contains 200 citations, fully indexed and including a table of contents.)

14D. Reliability

N81-15383/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Estimation Procedures to Measure and Monitor Failure Rates of Components During Thermal-Vacuum Testing.
R. E. Williams, and R. Kruger. Nov 80, 30p
NASA-TM-82052

Estimation procedures are described for measuring component failure rates, for comparing the failure rates of two different groups of components, and for formulating confidence intervals for testing hypotheses (based on failure rates) that the two groups perform similarly or differently. Appendix A contains an example of an analysis in which these methods are applied to investigate the characteristics of two groups of spacecraft components. The estimation procedures are adaptable to system level testing and to monitoring failure characteristics in orbit.

14E. Reprography

AD-A093 450/5 PC **A03**/MF **A01**
Ionomet Co., Inc., Brighton, MA.
An Ultrasensitive Electron (Soft X-Ray) Silver Halide/Chalcogenide Negative or Positive Inorganic Resist.
Annual rept. no. 1, 10 Sep 79-15 Oct 80,
Jerome M. Lavine. 10 Nov 80, 46p
Contract N00014-79-C-0788

We have successfully Ag-photodoped As2S3 using photographic Ag derived from evaporated AgBr. The use of evaporated AgBr has resulted in a 1000-fold increase in speed. We have shown that evaporated AgBr has very high sensitivity in the deep UV (50 microJ/sq cm at 2600 Angstroms), at soft x-ray wavelengths (5 microJ/sq cm at 7 Angstrom) and confirmed the previously observed e-beam sensitivity of 10 to the minus 9th power coulombs/sq cm. We have shown the feasibility of using evaporated AgBr as the photon sensitive layer of a multi-year photoresist system for sub-micron lithography. (Author)

AD-A093 480/2 PC **A05**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor.
Holographic Imaging Through Scattering Media.
Final rept. 27 Jun 79-26 Jun 80,
Anthony M. Tai, and Carl C. Aleksoff. Oct 80, 91p ERIM-143400-4-F, ARBRL-CR-00439, AD-E430 550
Contract DAAK11-79-C-0073

Holographic techniques for imaging through scattering media are reviewed. The concept of an imaging grating interferometer is introduced and its performance in imaging through scattering media is evaluated. The interferometric system is shown to be relatively insensitive to normal vibration and air disturbance. System design and fabrication techniques for the imaging grating interferometer are presented.

AD-A093 836/5 PC **A02**/MF **A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Holographic Optical Element (HOE) for Demultiplexing in Fiber Optic Systems,
Joseph L. Horner, and Jacques E. Ludman.
1980, 5p Rept no. RADC/ETR-80-0033
Pub. in SPIE, v215 p46-49 1980.

No abstract available.

AD-A093 925/6 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Determining Optical Flow.
Technical memo.,
Berthold K. P. Horn, and Brian G. Schunck. Apr 80, 30p Rept no. AI-M-572
Contract N00014-75-C-0643

Optical flow cannot be computed locally, since only one independent measurement is available from the image sequence at a point, while the flow velocity has two components. A second constraint is needed. A method for finding the optical flow pattern is presented which assumes that the apparent velocity of the brightness pattern varies smoothly almost everywhere in the image. An iterative implementation is shown which successfully computes the optical flow for a number of synthetic image sequences. The algorithm is robust in that it can handle image sequences that are quantized rather coarsely in space and time. It is also insensitive to quantization of brightness levels and additive noise. Examples are included where the assumption of smoothness is violated at singular points or along lines in the image. (Author)

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-072 283/5 PC **A02**/MF **A01**
Chemical Warfare Labs., Army Chemical Center, MD.
Resistance of Plastic Films to Penetration by CW Agents
GEORGE ROSE, and KENNETH D. BRUNELLI.
Oct 54, 12p Rept no. CRLR-388
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

PB81-803009 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical and Biological Warfare: Protection, Decontamination, and Disposal. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78.
Jan 81, 269p

This bibliography contains citations in the following four areas: Agent disposal by incineration, injection wells, ocean dumping, and chemical deactivation; decontamination and removal of agents on equipment, on clothing, in water, and from air including filtration and adsorption; collective protection systems for buildings, shelters, and vehicles, and protective clothing. (This updated bibliography contains 256 citations, none of which are new entries to the previous edition.)

PB81-803017 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical and Biological Warfare: Protection, Decontamination, and Disposal. 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1979-Jan 81.
Jan 81, 62p
Supersedes PB80-802929, and NTIS/PS-78/1296.

Government sponsored research is reported in the following four areas: Agent disposal by incineration, injection wells, ocean dumping, and chemical deactivation; decontamination and removal of agents on equipment, on clothing, in water, and from air including filtration and adsorption; collective protection systems for buildings, shelters, and vehicles; and, protective clothing. (This updated bibliography contains 54 citations, 25 of which are new entries to the previous edition.)

PB81-803025 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical and Biological Warfare: Biology, Chemistry, and Toxicology. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 266p
Supersedes PB80-802937, and NTIS/PS-78/1297.

This bibliography has been divided into three parts: Toxicology of chemical and biological agents; general biological and medical studies; and the properties, synthesis, and reactions of chemical agents and related compounds. Excluded are studies on the biochemistry and therapy of chemical agents. (This updated bibliography contains 252 citations, 16 of which are new entries to the previous edition.)

PB81-803033 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical and Biological Warfare: Detection and Warning Systems. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 258p
Supersedes PB80-802911, and NTIS/PS-78/1295.

This bibliography of Federally-funded research cites reports dealing with samplers, detectors, sampling techniques, and identification of chemical and biological agents. Organic phosphorus nerve agents, mustards, bacteria, and other such compounds are covered. Enzyme alarms are also discussed. (This updated bibliography contains 256 citations, 16 of which are new entries to the previous edition.)

PB81-803041 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical and Biological Warfare: Defoliants and Herbicides. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 173p
Supersedes PB80-802945, and NTIS/PS-78/1298.

The bibliography cites reports on the use of defoliants as warfare agents. The studies relate to their effectiveness, Government policies concerning them, and their use in South Vietnam. Included are basic research studies which were conducted at Edgewood Arsenal and Fort Detrick, or have direct application to warfare defoliants. (This updated bibliography contains 166 citations, 7 of which are new entries to the previous edition.)

PB81-803058 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical and Biological Warfare: General Studies. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78.
Jan 81, 296p

Research reports on warfare planning and civil defense studies; aerial dissemination of agents; containers, and delivery systems; and miscellaneous research are cited. (This updated bibliography contains 290 citations, none of which are new entries to the previous edition.)

PB81-803066 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical and Biological Warfare: General Studies. 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1979-Jan 81.
Jan 81, 46p
Supersedes PB80-802952, and NTIS/PS-78/1299.

The bibliography of Federally-funded research cites reports not covered by the other parts of this series. The topics are divided into the following areas: Warfare planning and civil defense studies; aerial dissemination of agents; containers, and delivery systems; and miscellaneous research. (This updated bibliography contains 41 citations, 31 of which are new entries to the previous edition.)

15C. Defense

AD-A093 624/5 PC **A05**/MF **A01**
Woodward-Clyde Associates, San Francisco, CA.
Candidate Industrial Preparedness Program.
Final rept.,
Rogers Cannell, and Edward Schuert. Dec 80, 87p Rept no. 60485A
Contract DCPA01-79-C-0304
Errata sheet inserted

Research in the area of industrial preparedness was most active in the 1960s when numerous studies were completed on subjects directly related to the survival of industry during a nuclear war. However, during this period no national policy evolved on the role industry should play nor were the requirements for a comprehensive industrial preparedness program developed. Industrial preparedness can be implemented either during peaceful times, or during a period of crisis at which time a nuclear attack appears to be imminant. The selected program should consist of those components necessary for survival of the population during the early post-attack period and for augmentation during the period of national recovery. In order to establish the requirements of industry in the post-attack environment it was necessary to estimate the condition of the country after a large-scale nuclear exchange, especially the relationship between the surviving population and the capacity of the residual industry to produce goods. Thus those industries essential to national survival and eventual recovery were evaluated with respect to their capability to provide products. Where the capability was insufficient to support the post-attack population, those industries became prime candidates for assistance through an industrial preparedness program.

AD-126 725/1 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Characteristic Kill Probability
ERWIN BISER. Oct 56, 16p Rept no. er e 1195
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

PB81-803371 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Intrusion and Weapon Detection: Crime Prevention. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80.
Jan 81, 123p
Supersedes PB80-801780, and NTIS/PS-78/1227.

Personnel and weapon detection methods are investigated in these Government-sponsored research reports. Metal detection of guns, antiintrusion devices, (e.g., burglar alarms, trip wires, etc.) and nuclear security are among the topics reviewed. Some of the reports are relative to military applications but could conceivably find civilian uses. (This updated bibliography contains 118 citations, 17 of which are new entries to the previous edition.)

PB81-803389 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Intrusion and Weapon Detection: Crime Prevention. 1970-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 81.
Feb 81, 129p
Supersedes PB80-801798, and NTIS/PS-78/1228.

Personnel and weapon detection methods are investigated in these research reports gathered in a worldwide literature survey. Metal detection of guns, anti-intrusion devices (e.g., burglar alarms, trip wires, etc.) and nuclear security are among the topics reviewed. Some of the reports are relative to military applications but could conceivably find civilian use. (This updated bibliography contains 123 citations, 16 of which are new entries to the previous edition.)

15D. Intelligence

AD-A093 675/7 PC **A03**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Implementation of Subjective Probability Estimates in Army Intelligence Procedures: A Critical Review of Research Findings.
Research rept.,
Ruth H. Phelps, Stanley M. Halpin, Edgar M. Johnson, and Franklin L. Moses. Mar 80, 39p Rept no. ARI-RR-1242

The purpose of this report is to critically examine the formulation and expression of uncertainty in both the tactical intelligence estimate of enemy threat and the evaluation of information contained in spot reports. A study was made of both the doctrinal procedures for expressing uncertainty (FM 30-5) and the research conducted to detect problems in implementing these procedures. Findings showed that current procedures which focus on the use of terms such as 'probable' and 'unlikely' to express uncertainty are ambiguous communicators for both the user and the recipient. The use of numerical subjective probability estimates as an alternative procedure (e.g., '.70' instead of 'likely') is explored by relating the psychological research on the use of subjective probability estimates with the need of Army intelligence analysts to unambiguously express uncertainty. It is concluded that there is sufficient evidence indicating the superiority of the numerical estimates to recommend a trial implementation of the use of numerical subjective probabilities. General guidelines are discussed for the incorporation of numerical estimates in the analysis and communications of Army intelligence. (Author)

AD-086 183/1 PC **A18**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Papers Presented at the Tri-Service Symposium on Signal Analysis and Data Processing in Electronic Countermeasures, May 23-25, 1955
Dec 55, 421p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-129 500/5 PC **A05**/MF **A01**
Signal Corps Electronic Warfare Center Fort Monmouth N J
Summary Report of Army Search Team Operations Number 3 - 1 September-31 October 1952
Mar 53, 81p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-380 296/4 PC **A02**/MF **A01**
Research Analysis Corp., McLean, VA.
Intelligence Requirements in Incipient Insurgency.
Technical paper,
Robert H. Williams. Dec 66, 7p Rept no. RAC-TP-240
Contract DA-49-083-OSA-3107
Distribution limitation now removed.

The paper deals with the problem of intelligence in the context of incipient insurgency in the underdeveloped country. The intelligence failure in Vietnam is contrasted with the successful intelligence effort during the Malayan Emergency and the reasons for both brought out. The main point is that this type of intelligence is a police function. The military seldom have the static organization required to maintain close contact with the population throughout the country. (Author)

15E. Logistics

AD-A093 583/3 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Parametric Simulation of the Direct Support Maintenance System in the Brigade Area.
Master's thesis,
Andrew George Loerch. Sep 80, 182p

This thesis presents a computer simulation model of the direct support maintenance system in the brigade area. Current and future maintenance doctrine is addressed as background, and is used as a basis for the model. Submodels to generate maintenance workload, perform the maintenance functions, and evaluate attrition of the maintenance units are discussed in detail. A program listing is provided and complete documentation is given. Data generated by the model is used as an example of a potential application. (Author)

AD-A093 605/4 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Modular Approach to Endurance Loading of Subsistence Stores in Naval Vessels.
Master's thesis,
Joseph Lee Palanuk. Sep 80, 76p

Subsistence load planning guidance currently used by U.S. Navy vessels is described and criticized. A modular subsistence load plan is presented. The modular load is designed to provide maximum subsistence endurance while requiring only a minimum of expertise in load planning. It is designed for use in an emergency when time is a critical factor. The advantages of using a modular load plan in an emergency are depicted using either a set of preplanned load tables or a load building program designed for a programmable calculator. The modular endurance load is evaluated against a normal operating load in a cost benefit analysis. The modular load is found to be superior, allowing greater endurance to be loaded in limited storage space and reducing the time and frequency of substance resupply operations. Because of the reduced number of food items in the modular load and the potential for adverse impact on crew morale, the modular load plan is recommended for emergency use only. (Author)

AD-A093 625/2 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Simplified Scheme to Perform Price Adjusting Sampling for Quality Assurance.
Master's thesis,
William Paul Keane. Sep 80, 66p

This thesis presents a quality assurance scheme which eliminates the necessity of rejecting lots. The mechanism used to motivate suppliers to provide lots at an acceptable quality level is to adjust the price paid for the lot based on the results of a sample. Information contained in Military Standard 105D and a concept referred to as Price Adjusted Single Sampling are combined in order to develop a system which allows a decision maker to find a sampling plan by selecting three parameters. (Author)

AD-A093 644/3 PC **A08**/MF **A01**
RAND Corp., Santa Monica, CA.
An Analysis of Weapon System Acquisition Intervals, Past and Present.
Interim rept.,
Giles K. Smith, and Ellen T. Friedman. Nov 80, 155p Rept no. RAND/R-2605-DRE/AF

Contracts F49620-77-C-0023, MDA903-78-C-0188

Critics of weapon system acquisition frequently claim that management process changes during the 1960s and 1970s caused the acquisition cycle to lengthen. A review of three classes of aerospace systems--aircraft, missiles and helicopters--shows that over the past 30 years the time from the beginning of full scale development to delivery of the first operational item has changed only slightly, but average production rates have fallen by half. The planning phase corresponding to today's Phase I (from Milestone I to Milestone II) has nearly doubled, and the introduction of Phase Zero may have added still more time, but evidence on Phase Zero effects is still tenuous. Opportunities for shortening the acquisition cycle time appear to lie mainly in flexible application of the regulations governing approval of the Mission Element Need Statement, and in some cases the Services should be allowed to proceed simultaneously with Phase Zero, and even Phase I, studies while the MENS is being reviewed. (Author)

AD-A093 672/4 PC **A21**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Type II Forward Storage Site Facilities: POMCUS System. Volume 2.
Final rept.,
Robert L. Porter. Sep 80, 500p Rept no. CERL-TR-P-112-VOL-2
See also Volume 1, AD-A092 310.

This two-volume report provides comprehensive generic information for the design and construction of future Prepositioned Materiel Configured to Unit Sets (POMCUS) installations, with specific attention to: (1) The particular facility requirements of POMCUS installation user/occupants in accomplishing the storage, maintenance, and issue functions. (2) The military threats and vulnerabilities. (3) The NATO construction funding justification provisions. (4) The lessons learned from the daily operations and Return of Forces to Germany (REFORGER) exercises occurring on the existing Combat Equipment Group-Europe (CEGE) sites. Information in this report was compiled from three sources relevant to the decision-making process: (1) supplies and equipment data, (2) Army and Congressional literature, and (3) the experience and knowledge of CEGE personnel. (Author)

AD-A093 705/2 PC **A03**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Laboratory Vibration Schedules.
Final rept. on test operations procedure.
22 Dec 80, 35p Rept no. TOP-1-2-601
Supersedes Rept. no. TOP-1-2-601 dated 20 Mar 75, AD-A008 234.

This report provides schedules for conducting laboratory vibration tests of Army materiel and discusses selection of schedules. Covered are simulated logistical transportation of secured cargo, and tactical transportation of equipment installed in ground vehicles and helicopters and mounted externally on helicopters. Schedules include vibration levels, frequencies, and test time for various simulations. It is applicable to ammunition (including close support rockets and missiles) and to electronic, mechanical, and optical equipment.

AD-A093 938/9 PC **A05**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
A Feasibility Study of Using Failure Rate Data to Improve Initial Replacement Rates.
Final rept. Oct 77-Oct 79,
Paul Hubal, and Jean St. Laurent. Jan 81, 80p Rept no. DTNSRDC-81/008

The Initial Replacement Rates (INREP) project sought to identify sources of failure/replacement/engineering data which could possibly be used to supplement existing Navy sources of initial replacement rate data. Data generated by the Government-Industry Data Exchange Program (GIDEP) and the Reliability Analysis Center (RAC) were identified as the most likely candidates. GIDEP and RAC data were compared with existing initial replacement rate data and with operational data to evaluate the range of coverage and the quality of the rates. The primary conclusion is that the range of coverage of the GIDEP and RAC data is much smaller than the range of coverage of the existing initial replacement rate data and that neither the GIDEP nor the RAC data compare more accurately with operational data than the existing initial replacement rate data. Therefore, the GIDEP or RAC data bases are not needed by the Navy for initial provisioning unless the existing initial replacement rate data do not include data for a particular item. (Author)

PB81-150369 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
Opportunities Still Exist for the Army to Save Millions Annually Through Improved Retail Inventory Management.
Report to the Congress.
19 Jan 81, 43p LCD-81-16

GAO reported to the Secretary of Defense in November 1975 that the Army could save tens of millions of dollars annually through improved retail inventory management. DOD agreed and advised GAO of several corrective actions that the Army would take to bring about the desired improvements. GAO found that the Army has made little progress in resolving the previously disclosed retail inventory management problems and that opportunities for savings of $126 million exist.

15G. Operations, Strategy, and Tactics

AD-A093 778/9 PC **A09**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
The Role of the Air Assault Division on the European Battlefield.
Master's thesis,
Conrad J. McHugh. 6 Jun 80, 189p AD-E750 050

This study attempts to determine how the air assault division can best be employed on the modern mechanized battlefield. The investigation is focused on an analysis of Soviet ground tactics and organizations in comparison with US air assault tactics and organization. Soviet air assault concepts and doctrine are also examined to identify trends which may affect US air assault operations. Investigation reveals that a distinct need exists to expand current air assault doctrine to address the complexities of combat on the mechanized battlefield. This study recommends that the scope of FM 71-101, INFANTRY, AIRBORNE AND AIR ASSAULT DIVISION OPERATIONS, be adjusted to address current doctrinal voids and shortcomings. (Author)

AD-A093 975/1 PC **A02**/MF **A01**
Army Field Artillery School, Fort Sill, OK.
Interoperability and Combined Operations.
Special bibliography (Final),
Lester L. Miller, Jr. 15 Jun 81, 9p Rept no. SB-74

This bibliography covers documents and periodicals on the subject of interoperability which is the ability of a system, unit, or military/naval force to interchange services with other organizations in pursuit of a joint goal. Periodical articles on the much older concept of combined operations are also included. This involves nations which combine forces/tactics for a specific mission. The materials have been selected from holdings of the Morris Swett Library, USAFAS. (Author)

16.
MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A093 728/4 PC **A04**/MF **A01**
Weidlinger Associates, New York.
Venting and Blow-by Effects for the MX Trench Basing Mode.
Final rept. 9 Sep 76-31 Mar 80,
Ivan S. Sandler. 31 Mar 80, 52p DNA-5296F
Contract DNA001-76-C-0390

Two separate studies with simple models have been performed to study MX trench/plug venting and blow-by effects. By means of parameter variations, many of the uncertainties in the in-trench blast environment were taken into account. In the first study, it was found that the impulse loading on the blast plug was limited primarily by lack of containment of the trench pressures due to the light overburden and weak trench roof. In the second study, it was found that a 10m long blast plug is sufficient to withstand expected blow-by effects. (Author)

16C. Missile Warheads and Fuses

AD-A093 741/7 PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA. Aerophysics Lab.
Roll Resonance Control of Angle of Attack for Reentry Vehicle Drag Modulation.
Interim rept.,
D. H. Platus. 10 Dec 80, 29p TR-0081(6940-02)-4, SD-TR-80-84
Contracts F04701-80-C-0081, F04701-79-C-0080

Slender ballistic reentry vehicles are highly susceptible to roll rate changes caused by small asymmetries in mass and configuration. One particular combination of asymmetries, consisting of a body-fixed trim angle of attack and a small radial c.g. offset, can cause a rapid spinup into resonance, with a large amplification in trim angle of attack and a concomitant increase in drag. By controlling the magnitude and direction of the c.g. offset with a moving-mass roll control system, it is possible to control the roll rate near resonance and to limit the angle-of-attack and drag response to a controlled value. A feedback law is derived, and the control system is demonstrated with a digital-computer simulation of the equations of rotational motion. (Author)

AD-308 158/5 MF **A01**
Diamond Ordnance Fuze Labs., Washington, DC.
Research and Development on Fuzes for Guided Missiles and Large Rockets.
Progress rept., 1 Oct-31 Dec 57.
31 Dec 57, 10p Rept no. pr 57 40
See also AD-308 084L.
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

16D. Missiles

AD-A093 762/3 PC **A02**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC.
New Survey Challenges in Support of the DMA Mission,
Larry D. Beers. Jan 81, 12p

This paper discusses the major geodetic and geophysical surveys that the Geodetic Survey Squadron is engaged into support DOD programs and particularly the technological improvements that must be made in survey methodology if the ever-increasing requirements of the military weapon systems of the mid- to late 1980s are to be met. Gravity, deflection of the vertical, inertial, astronomic and distance measuring equipment and techniques are all presented in the paper. Many of the discussions in the paper are applicable to precise surveying in the civil area. (Author)

AD-A093 954/6 Not available NTIS
Tactical Weapon Guidance and Control Information and Analysis Center, Chicago, IL.
Proceedings of the Open Sessions of the Workshop on Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance Held at Redstone Arsenal, Alabama on 19-20 November 1979,
Lewis G. Minor. Nov 79, 519p Rept no. GACIAC-PR-80-01
Availability: Tactical Weapon Guidance and Control Information Analysis Center, 10 W. 35th St., Chicago, IL 60616 HC $35.00.

This Proceedings contains papers presented in, and submitted for, the Open Sessions of the Workshop on Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance that was held at the US Army Missile Command, Redstone Arsenal, Alabama, on 19-20 November 1980. This volume contains papers from sessions on: Image Processing and Pattern Recognition Algorithms for Missile Guidance, Advanced Imaging Trackers for Missile Guidance, and Image Understanding and Autonomous Acquisition for Missile Guidance. (Author)

AD-065 597/7 PC **A02**/MF **A01**
Signal Corps Electronic Warfare Center Fort Monmouth N J
Guided Missile Signal Intercept
Training Circular No. 1.
donald s. cannon. Oct 52, 21p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-850 820/2 PC **A10**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
Electro-Interference Test Report for the Instrumentation Unit Mod 8, Figure A 6380 and Metric Tracking System ETR 6388. Volume 3,
Ebner E. Kinonen. 16 Jul 68, 225p T2-3698-3, SAMSO-TR-69-18-3
Contract AF 04(694)-791
Includes Revision A dated 24 Mar 69. See also Volume 4, AD-850 821L.
Distribution limitation now removed.

This document (Volume 3 of 8) reports the results of the Electro-Interference test performed on the Instrumentation Unit MOD 8/Metric Tracking System Figure A 6380/ETR 6388 S/N GTM-065. The MOD 8 and MTS wafers were tested to determine its degree of compliance to AF/BSD Exhibit 62-87, Electro-Interference Control Requirements for Minuteman as required by contract.

AD-850 821/0 PC **A09**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
Electro-Interference Test Report for the Instrumentation Unit Mod 8, Figure A 6380 and Metric Tracking System ETR 6388. Volume 4,
Ebner E. Kinonen. 16 Jul 68, 192p T2-3698-4, SAMSO-TR-69-18-4
Contract AF 04(694)-791
Includes Revision A dated 24 Mar 69. See also Volume 5, AD-850 825L.
Distribution limitation now removed.

No abstract available.

AD-850 822/8 PC **A06**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
Electro-Interference Test Report for the Instrumentation Unit Mod 8, Figure A 6380 and Metric Tracking System ETR 6388. Volume 8,
Ebner E. Kinonen. 16 Jul 68, 114p T2-3698-8, SAMSO-TR-69-18-8
Contract AF 04(694)-791
Includes Revision A dated 24 Mar 69. See also Volume 7, AD-850 823L.
Distribution limitation now removed.

This document (Volume 8 of 8) reports the results of the Electromagnetic Interference Test on the Boeing 10-21664 Radio Transmitter Motorola Part No. 01-21720J01.

AD-850 823/6 PC **A10**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
Electro-Interference Test Report for the Instrumentation Unit Mod 8, Figure A 6380 and Metric Tracking System ETR 6388. Volume 7,
Ebner E. Kinonen. 16 Jul 68, 219p T2-3698-7, SAMSO-TR-69-18-7
Contract AF 04(694)-791
Includes Revision A dated 24 Mar 69. See also Volume 8, AD-850 822L.
Distribution limitation now removed.

This document reports the results of the Electro-Interference Test performed on the C-Band Transponder Set P/N 3510401, Avion type 162C, built to Boeing SCD 10-215999.

AD-850 824/4 PC **A04**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
Electro-Interference Test Report for the Instrumentation Unit Mod 8, Figure A 6380 and Metric Tracking System ETR 6388. Volume 1,
Ebner E. Kinonen. 16 Jul 68, 73p T2-3698-1, SAMSO-TR-69-18-1
Contract AF 04(694)-791
Includes Revision A dated 24 Mar 69. See also Volume 2, AD-850 815L.
Distribution limitation now removed.

This document (Volume 1 of 8) reports the results of the Electro-Interference test performed on the Instrumentation Unit MOD 8/Metric Tracking System Figure A 6380/ETR 6388 S/N GTM-065. The MOD 8 and MTS wafers were tested to determine its degree of compliance to AF/BSD Exhibit 62-87, Electro-Interference Control Requirements for Minuteman. The test was conducted in accordance with the requirements of D2-31414-1, Electro-Interference Test Plan - MOD 7/MOD 8/MM III, and with the detailed Electro-Interference Test Procedures Document D2-18498-1. The test items were connected to STE that simulated wafer interfaces and permitted the instrumentation unit to function in its operational modes while the generated interference measurements, susceptibility tests and antenna conducted tests were made. No spurious emanations exceeding AF/BSD Exhibit 62-87 were noted in the PCM system due to the off-frequency signal being injected during the transmitter cross-modulation test.

AD-850 825/1 PC **A10**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
Test Report, Electro-Interference Susceptibility Tests - Mod 8 (Figure A 6380) and Metric Tracking System (ETR 6388). Volume 5,
Ebner E. Kinonen. 16 Jul 68, 221p T2-3698-5, SAMSO-TR-69-18-5
Contract AF 04(694)-791
Includes Revision A dated 24 Mar 69. See also Volume 6, AD-850 826L.
Distribution limitation now removed.

This document contains the results of Electro-Interference Susceptibility tests on the MOD 8/MTS (Figure A 6380/ETR 6388) and MOD 8 (Figure A 6380 only) airborne instrumentation section configurations. (Author)

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

AD-387 295/9 PC **A08**/MF **A01**
Martin Marietta Aerospace, Orlando, FL.
Optical Area Correlator (Environmental and Flight Test).
Final rept. Feb-Nov 66,
Paul Porter. Oct 67, 170p OR-8628, AFATL-TR-67-181
Contract AF 08(635)-5706
Distribution limitation now removed.

This is the final report of a program to demonstrate the feasibility of using optical area correlation tracking for terminal guidance of air-to-surface missiles. The results are also used to determine the performance characteristics of a fourth generation model, optical area correlator. The test program has demonstrated the feasibility of using area correlation guidance techniques for area type air-to-surface munitions. The Martin Marietta tracker demonstrated a CEP of 151 feet, extrapolated to missile impact, from a launch range of 8 nautical miles. An operational tracker based on this design, when used as a terminal guidance system for a tactical missile, could be operated in either of two modes: (1) The pilot selects the target, centers the gunsight, engages the memory, and fires the missile. (2) This mode is the same as the first except the target signature is placed in the system's memory before takeoff using reconnaissance information.

17A. Acoustic Detection

AD-A093 862/1 PC **A02**/MF **A01**
Tracor Applied Sciences, Austin, TX.
Hybrid Passive Tracking Algorithms. Executive Summary,
Glenn Corser. 31 Oct 80, 11p

For the past several years Tracor has been conducting research on the performance and utility of a batch algorithm, used for underwater tracking with passive sonobuoys, called the Maximum Likelihood Procedure (MLP). To provide a means of comparison with the MLP and also in an attempt to gain insight into the applicability of sequential algorithms to underwater tracking, Tracor, in conjunction with Dr. Byron Tapley of the University of Texas, designed and implemented a sequential tracking algorithm based on the extended Kalman filter. After testing of the MLP and sequential algorithms revealed their complementary strengths, it was decided that a combination of the two approaches, or a hybrid algorithm, should be developed. Thus, the primary objectives of this contract were to: implement a simpler, faster batch initializing procedure; implement a numerically more stable sequential algorithm; devise more appropriate switching rules for going from batch to sequential and vice versa; and to streamline and generalize the program.

AD-A093 867/0 PC **A06**/MF **A01**
Tracor Applied Sciences, Austin, TX.
Hybrid Passive Tracking Algorithms.
Final rept.,
Glenn Corser, and Thomas Wilson. 31 Oct 80, 125p
Contract N00014-78-C-0670

This report is concerned with the refinement and performance evaluation of a passive hybrid tracking algorithm. It is composed of a simplified batch filter and a numerically-stable extended Kalman filter, linked together by a set of statistically meaningful switching rules. Comparisons in performance between the hybrid, Tracor's MLP algorithm, and a sequential-sequential algorithm (where the batch initializer is replaced with an iterated extended Kalman Filter) are made using simulated data. (Author)

AD-160 220/0 MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Army Electronic Countermeasures Equipment
May 57, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

N81-15182/1 PC **A02**/MF **A01**
Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (Germany F.R.).
Vector Processors for Sonar Array Processing.
J. Boehme. Feb 80, 25p REPT-3-80
Contract BMVG-GF-79
In German; English Summary.

Some problems and methods of digital array processing of passive sonar signals are reviewed such as beamforming, spectral analysis over frequency and angle, and high resolution estimation. The corresponding computational problems are collected. Suitable algorithms are indicated for vector and array processors. Some vector processors used in computer controlled systems for passive sonar array processing by research laboratories is discussed. A distinction is made between medium scale processors for distributed computing in parallel. Software aids for programming of array processing algorithms and implementations of high level signal processing languages are also considered.

17B. Communication

AD-A093 465/3 PC **A02**/MF **A01**
Royal Signals and Radar Establishment, Malvern (England).
The Use of the IEEE-488 Bus and the MASCOT Philosophy in Automatic Test Equipment.
Memorandum rept.,
M. O'Brien. Sep 80, 23p RSRE-MEMO-3285, DRIC-BR-76468

This memorandum describes the results of research undertaken to investigate the suitability of the IEEE-488 Bus as a standard ATE bus and the Modular Approach to Software Construction Operation and Test (MASCOT) as a standard software technique in Automatic Test Equipment. (Author)

AD-A093 511/4 PC **A02**/MF **A01**
MITRE Corp., Bedford, MA.
Electronic circuits and Optical Sources for Fiber Optic Systems.
Interim rept.,
G. L. Tenuta. Nov 80, 23p RADC-TR-80-310
Contract F19628-80-C-0001

This document is one in a series of technical reports on the subject of fiber optic systems design. This report covers the electronic circuits and optical components needed to design high-performance laser and LED (light, emitting diode) transmitters for optical communications. Subsequent reports in this series will cover the design of low-noise, high-sensitivity preamplifiers, including related hardware such as AGC (automatic gain control) and FM receivers. Applications involving a bi-directional link and video transmitter and receiver are also described, as well as architectures and concepts for development of complete systems. (Author)

AD-A093 513/0 PC **A03**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Development of a Voice Funnel System.
Quarterly technical rept. no. 6, 1 Nov 79-31 Jan 80,
R. Rettberg. Nov 80, 50p Rept no. BBN-4563
Contract MDA903-78-C-0356, ARPA Order-3653

This Quarterly Technical Report covers work performed during the period noted on the development of a high-speed interface, called a Voice Funnel, between digitized speech streams and a packet-switching communications network. (Author)

AD-A093 557/7 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The Effects of Concurrent Motor Tasking on Performance of a Voice Recognition System.
Master's thesis,
John William Armstrong. Sep 80, 105p

This research investigated the effects of concurrent operator motor loading on performance of a voice recognition system comprised of a human operator and a discrete utterance voice recognition system. Incresed concurrent operator motor loading (with respect to that experienced during training of the voice recognition system) was found to degrade system performance. Operator motor loading was manipulated using a rotary pursuit tracker. A special vocabulary was used to ensure a baseline recognition error rate to facilitate detection of factors influencing system performance. The results using the special vocabulary also indicated the performance degradations that a real world operator may encounter when using different phrases that are similar to one another in sound. (Author)

AD-A093 643/5 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
Environmental Constraints in Earth-Space Propagaton.
Memoransum rept.,
John M. Goodman. 20 Nov 80, 57p Rept no. NRL-MR-4339

The advantages of utilizing space for telecommunications is well known in both the commercial and military arenas. A small complement of satellites at synchronous orbit, for example, may provide nearly global coverage and may be designed to support small disadvantaged customers as well as those characterized by large antenna structures and sophisticated acquisition and processing capabilities. Modern navigational and timing needs can also be satisfied through exploitation of space platforms and NAVSTAR/GPS is a system which exemplifies the utilization of space for those purposes. Applications of space in surveillance and kindred areas also exist and spaceborne instruments for monitoring the exoatmospheric environment and transmissions from the sun abound. There is an obvious charm in the utilization of space for various purposes, however most applications require the transmission of intelligence or data between space platforms and other space segments or a ground terminal. Thus the channel or the propagation path clearly becomes a part of the total system as a perturbation source. The nuisance value of the propagation path derives from the extent to which it does not duplicate free space at a specified frequency. This paper reviews the general utilization of space to introduce the importance of earth-space radio propagation with special emphasis directed toward DoD mission areas. An outline of the basic properties of earth-space RF propagation follows and finally an assessment of the major effects is given. (Author)

AD-A093 647/6 PC **A02**/MF **A01**
Defense Communications Engineering Center, Reston. VA.
Attributes for Timing for a Digital DCS.
Engineering publication rept.,
Harris A. Stover. Jul 80, 21p Rept no. DCEC-EP-1-80

In the future when the DCS becomes predominantly digital, employing time division multiplexing and/or switching, a system timing capability must be provided. In a complex digital DCS under wartime conditions, timing is difficult to achieve. As a basis to evaluate the effectiveness of different timing approaches, a set of desired attributes is needed. Suggested attributes with reasons for each are given. (Author)

AD-A093 703/7 MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Communications Special Evaluation Report, Nellis AFB Test Range, Nevada, 8-17 September 1980.
Final rept.,
Robert S. Antonio, and Donald J. Ambrose. 3 Dec 80, 97p Rept no. 80/66S-223
Availability: Microfiche copies only.

A Communications Special Evaluation was performed at Nellis AFB Test Range, Nevada from 8-17 September 1980. The purpose of the evaluation was to define the capabilities and limitations of the range communications system. Included in this report are the results and anlaysis of ground equipment, system measurements, and measured receive signal levels as they affect horizontal and vertical coverage of the Sally and Lee Corridors. This report can be used as a guide for anticipated performance of the range communications system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile. (Author)

AD-A093 800/1 PC **A09**/MF **A01**
Harris Corp., Melbourne, FL.
Rapid Acquisition of Spread Spectrum Signals.
Final rept. 29 Oct 79-28 Oct 80,
M. J. Bouvier, Jr., H. E. Walls, and R. W. Boyd. Dec 80, 178p 1634-8019, ARO-17105.1-A-EL
Contract DAAG29-80-C-0005

This investigation has focused on the fundamental principles of the acquisition process, mathematically quantifying potential acquisition performance as a function of receiver structures and devices, spreading waveforms and specially structured acquisition signals. Certainly the most obvious conclusion is that MF devices offer a relatively straightforward means (for DS systems at least) of achieving two to three orders-of-magnitude improvement in acquisition time. These magnitudes of improvement are quite significant for reacquisition operations in which only coarse or fine timing uncertainties exist. In addition, acquisition with a MF results in the smallest residual timing uncertainty at the completion of the acquisition process. Therefore, every attempt should be made to exploit this rapidly developing technology, especially for application to DS data links which require both rapid reacquisition and precision ranging capabilities. A specific recommendation for further work in this area is presented. (Author)

AD-A093 808/4 PC **A04**/MF **A01**
Army Electronics Research and Development Command, Fort Monmouth, NJ. Electronic Warfare Lab.
Digital Phase Measurement Techniques.
Research and development technical rept.,
Charles E. Konig, and John T. Cervini. Dec 80, 63p Rept no. DELEW-TR-80-4

This report describes the techniques and circuit designs necessary to implement the interface requirements to the Modular Adaptive Signal Sorter (MASS) processor. A phase interferometer system is described which provides the frequency and a phase information which are then converted to digital data words. Then, specific digital processing techniques are used to obtain the angles-of-arrival which are then available for display and for transferring to the MASS processor.

AD-A093 850/6 PC **A04**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Efficient Encoding and Decoding of Speech.
Final rept. 1 Nov 79-31Dec 80,
M. Berouti, M. Krasner, and J. Makhoul. Nov 80, 51p Rept no. BBN-4567
Contract MDA940-79-C-0411

This report concludes our work for the past year on efficient coding and decoding of speech. During the past year, we have developed and optimized an adaptive predictive coding (APC) system for high quality speech encoding at 16 kb/s. In our research, we have examined many issues which we described in this report. The system uses the noise-feedback APC configuration, chosen because of the computational efficiencies in implementing spectral noise shaping. The many-level, non-uniform quantizer is derived as a piece-wise

linearization of a mu-law non-linear quantizer. The encoding scheme is an entropy coder using a self-synchronizing variable-length code which is matched to the quantization. A simple pole-zero spectral noise shaping is adapted as a function of the input speech spectrum. System parameters are perceptually optimized via listening experiments. As a conclusion to the algorithm development, different implementation strategies were studied as well as methods for decreasing computational complexity. The computational requirements of the algorithm were related to the features of several technologies. (Author)

AD-A093 851/4 PC **A06**/MF **A01**
S. Consulting Services, Sands Point, NY.
Adaptive Techniques in Multichannel Transmission.
Final rept. 7 Jul 78-30 Jun 79,
L. Milstein, R. Pettit, S. Rappaport, and D. L. Schilling. 30 Jun 79, 155p
Contract DAAB07-78-C-0173

This report presents a new method of acquisition of a spread spectrum signal. In addition, a comparison is made between the error probability of several modulation/spreading techniques as a function of the jammer-to-signal (J/S) power ratio and the signal-to-noise (E sub b/N) ratio. (Author)

AD-A093 869/6 PC **A04**/MF **A01**
Defense Communications Agency, Arlington, VA.
DCS Operating-Maintenance Electrical Performance Standards.
29 Sep 80, 75p Rept no. DCA-CIRC-300-175-9
Supersedes Rept. no. DCA-CIRC-300-175-9 dated 20 Dec 77.

This Circular specifies Technical Schedules and Standards necessary to operate and maintain Government-owned circuits at the expected level of performance for the Defense Communications System. This information is provided for use by circuit engineers and allocators in routing and activating new circuits and by O&M personnel in troubleshooting, testing, and correcting circuit deficiencies. The document also contains information on the availability and performance of leased circuits in the CONUS, tariff requirements, and commercial carrier performance objectives. In the case of leased circuits the information can be used in selecting commercial offerings for specific communication services, testing leased lines, and determining possible causes of trouble when service becomes unsatisfactory. This circular applies to Headquarters,DCA; DCA field activities; the military departments; and other activities of the Department of Defense and Government agencies responsible for the operation and maintenance of DCS.

AD-A093 870/4 PC **A12**/MF **A01**
Defense Communications Agency, Arlington, VA.
System Interface Criteria.
21 Sep 78, 251p Rept no. DCA-CIRC-370-V175-6
Supersedes Rept. no. DCA-CIRC-370-V175-6 dated Feb 65.

This Circular establishes the criteria to provide engineering guidance for interface between connecting telecommunication systems and equipment and the DCS AUTOVON worldwide. This Circular applies to Headquarters, DCA, DCA field activities, the military departments, and other activities of the Department of Defense and governmental agencies responsible for the implementation, operation, and maintenance of elements of the Defense Communications System (DCS) and related communications activities.

AD-A093 899/3 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Electrical Engineering.
A Novel Innovations Based Time-Domain Pitch Detector,
D. T. L. Lee, and M. Morf. 1980, 7p AFOSR-TR-80-1212
Contracts F49620-79-C-0058, DAAG29-79-C-0047
Pub. in International Conference on Acoustics, Speech and Signal Processing (1980), Denver, CO, 9-11 Apr 80, p40-44.

No abstract available.

AD-A093 913/2 Not available NTIS
Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
Optimal Phases of Maximal Length Sequences for Asynchronous Spread-Spectrum Multiplexing,
F. D. Garber, and M. B. Pursley. 28 Jul 80, 3p
ARO-15492.11-EL
Grant DAAG29-78-G-0114
Availability: Pub. in Electronics Letters, v16 n19 p756-757, 11 Sep 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 922/3 PC **A06**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Fleet Reliability Assessment Program. Volume 2B. Equipment Report NAVMACS A+.
Final rept.
Sep 79, 105p
See also Volume 2C, AD-A093 923 and Volume 2, AD-A068 856.

During the period 1 June 1978 and 30 April 1979 the AN/SYQ-7(V)2 NAVMACS A+ System was monitored by FRAP under operational conditions in a heavy ship-to-shore traffic environment on deployed platforms. A total of 19 selected platforms participated in the study during which 53,272 hours of operating time was accumulated. A total of 26 equipment failures were reported, which places the observed equipment MTBF at 2049 hours. At the 90% confidence limits, the actual equipment MTBF is not greater than 2827 nor less than 1629 hours. The observed duty cycle for this system (operating hours/calender hours) was 0.556.

AD-A093 923/1 PC **A02**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Fleet Reliability Assessment Program. Volume 2C. Equipment Report CV-3333/U VOCODER.
Final rept.
Sep 79, 23p
See also Volume 2D, AD-A093 924 and Volume 2, AD-A068 856.

The report contains an assessment of CV-3333/U Vocoder reliability performance observed on 22 platforms from approximately June 1978 thru March of 1979. 2 failures occurred during a reported 47,677 operating hours. The point estimate MTBF is 23,838 hours. (Author)

AD-A093 924/9 PC **A02**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Fleet Reliability Assessment Program. Volume 2D. Equipment Report ON-143(V)5/USQ.
Final rept.
Sep 79, 25p
See also Volume 2, AD-A068 856 and Volume 3, AD-A068 857.

The report contains a reliability, maintainability and availability assessment of ON-143(V)USQ data collected from approximately ten submarines for a period of nine months. The estimated MTBF was 4158 hours at a 90% confidence interval. (Author)

AD-048 152/3 PC **A09**/MF **A01**
Army Signal Radio Propagation Agency, Fort Monmouth, NJ.
The Application of Radio Propagation Theory in Estimating Jamming Vulnerability of Circuits 2000 Kilometers or Greater in Length
Mar 53, 191p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-064 940/0 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Anti-Jamming Techniques by the Use of Obstacle Gain for VHF and UHF Communication Systems
JOHN J. EGLI. Feb 55, 3p Rept no. tm m 1620
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-079 442/0 MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Countermeasures Transmitter Set AN/TLT-3()
FRED H. MCCALL, and FRED W. JR. WACHTER. May 55, 10p Rept no. er e 1158
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-115 377/4 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Initial Operational Considerations Regarding Radio Centrals
DONALD H. HAMSHER. May 56, 6p Rept no. tm m 1781
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-128 929/7 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
An a. J. Radio Remote Control System
MORRIS ACKER. Jun 56, 15p Rept no. tm m 1778
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-160 101/2 MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
A Study of Electronic cm Systems for Use Against Enemy Tactical Communications in the 1960 Time Period
JOHN D. WOODWORTH, and RALPH L. JR. MCCOY. May 57, 10p Rept no. er e 1206
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-300 673/1 PC **A07**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Study of Division Radio Central Vulnerability
Jun 58, 127p Rept no. TR-1968
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-306 182/7 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Statistical Analysis of the Performance of a Tactical Communication Jammer at Frequencies Above 40 mc/S over Irregular Terrain
A.A. SILVA. Aug 58, 20p Rept no. tr1977
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-309 715/1 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Ecm Susceptibility of Radio Set AN/VRC-24(Xc-1)
Technical rept.,
alan diamond. 5 Jan 59, 16p Rept no. TR-2036
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-313 105/9 MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Vulnerability of a Communication Satellite in a Synchronous Orbit
Technical rept.,
h.r. austin, and r.h. noyes. 1 May 59, 10p Rept no. ECOM-TR-2053
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-848 033/7 PC **A05**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
In-Plant Engineering Test Program Engineering Development Laboratory/Performance Test (EDL/PT) Report Figure A 1473M Receiver Group.
Final test rept.,
Chek P. Fong, and Robert W. Brill. 28 Dec 67, 84p T2-3269-5, SAMSO-TR-68-105

Contract AF 04(694)-545
Includes Revision A, Revision B dated 19 Sep 68, and Revision C dated 5 Feb 69.
Distribution limitation now removed.

This document summarizes the results of the Performance Tests conducted on Figure A 1473M. These tests were performed by Engineering in the Engineering Development Laboratory. Performance of these tests establishes the degree of design margin in the Figure A 1473M. (Author)

AD-848 034/5 PC **A03**/MF **A01**
Boeing Co., Seattle, WA. Missile and Information Systems Div.
In-Plant Engineering Test Program Engineering Development Laboratory/Performance Test Report (EDL/PT) - Figure A 1251M - Status-Command Message Processing Group.
Final rept.,
Robert W. Martin, Jr. 18 Mar 68, 44p T2-3269-14, SAMSO-TR-68-395
Contract AF 04(694)-545
Includes Revision A dated 4 Nov 68.
Distribution limitation now removed.

This test report document contains reports of tests performed on the Minuteman Command Message Processing Group, Figure A 1251M at RCA facilities in Camden, New Jersey. Objectives, conclusions, summaries of test results, and test descriptions of the Figure A 1251M Performance Tests are presented.

DOE/ER/10003-T1 PC **A06**/MF **A01**
National Telecommunications and Information Administration, Boulder. CO. Inst. for Telecommunication Sciences.
Impact of SPS Heating on VLF, LF, and MF Telecommunications Systems Ascertained by Experimental Means.
C. M. Rush, E. J. Violette, R. H. Espeland, J. C. Carroll, and K. C. Allen. Jul 80, 103p
Contract AI02-79CH10003

The results of experiments undertaken to assess the potential impact of the operation of the Satellite Power System on the D and E regions of the ionosphere, and on telecommunication systems that are dependent upon the structure of the lower ionosphere are summarized. Using the high-power high-frequency transmitter facility located at Platteville, Colorado, power densities comparable to the Satellite Power System can be delivered to the heights of 70 to 100 km above the surface of the earth. Observations of the performance of telecommunication systems that operate in the VLF, LF, and MF portions of the spectrum have been investigated during times when the ionosphere was modified with SPS comparable power density and when it was not. The results obtained indicte that the SPS, as currently configured with a peak power density of 23 mW/cm exp 2 , will not adversely impact upon the performance of VLF, LF, and MF telecommunication systems. (ERA citation 06:005880)

N81-15180/5 PC **A09**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Ku-Band Multiple Beam Antenna.
Final rept.,
C. C. Chen, and C. F. Franklin. Dec 80, 187p
NASA-CR-154364
Contract NAS1-14814

The frequency reuse capability is demonstrated for a Ku-band multiple beam antenna which provides contiguous low sidelobe spot beams for point-to-point communications between any two points within the continental United States (CONUS), or regional coverage beams for direct broadcast systems. A spot beam antenna in the 14/21 GHz band which provides contiguous overlapping beams covering CONUS and two discrete beams covering Hawaii and Alaska were designed, developed, and tested. Two reflector antennas are required for providing contiguous coverage of CONUS. Each is comprised of one offset parabolic reflector, one flat polarization diplexer, and two separate planar array feeds. This antenna system provides contiguous spot beam coverage of CONUS, utilizing 15 beams. Also designed, developed and demonstrated was a shaped contoured beam antenna system which provides contiguous four time zone coverage of CONUS from a single offset parabolic reflector incorporating one flat polarization diplexer and two separate planar array feeds. The beams which illuminate the eastern time zone and the mountain time zone are horizontally polarized, while the beams which illuminate the central time zone and the pacific time zone are vertically polarized. Frequency reuse is achieved by amplitude and polarization isolation.

N81-15181/3 PC **A13**/MF **A01**
Graz Univ. (Austria). Inst. fuer Nachrichtentechnik und Wellenausbreitung.
Analysis of Satellite Digital Transmission Links Using Characteristics of the Orbital Test Satellite (Ots) Transponder Analyse von Satellitenverbindungen Zur Uebertragung Digitaler Signale Unter Besonderer Beruecksichtigung der Transponder Charakteristiken des Orbital Test Satellite (Ots).
S. Ulrich. Apr 79, 281p INW-7806
In German; English Summary.

The data link by means of the transponder Module B of the experimental European satellite OTS (Orbital Test Satellite) is being analysed. Most of the results were obtained by numerical simulation of the behavior of the channel employing the computer program TSIM. Using given transponder characteristics, the variable parameters of the transmission channel were optimized for minimal signal-to-noise ratio for a given bit-error rate. Furthermore, the sensitivity of the transmission system against various factors such as band limitation, nonlinearities, beat-interference, etc., are investigated. For this purpose, a method is presented which permits splitting the overall degradation into several additive contributions in order to assess the influence of the various degradation factors on the quality of the transmission.

N81-15220/9 PC **A02**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Benchmarking Use for Verification of Traffic Capacity in Spc Switching Il Benchmark Per la Verifica Della Capicita' di Traffico di Autocommutatori Spc.
M. Brizzi, and D. Grillo. May 79, 9p FUB-16-1979
In Italian; English Summary. Presented at 27TH Intern. Conv. On Commun., Genoa, 9-12 Oct. 1979.

Testing the call carrying capacity of SPC telephone switching systems in the final stage of development or just before cutover may be carried out, similarly as for general purpose computing systems, by means of benchmarking. To this end, artificial traffic reflecting both normal and critical load conditions is submitted to the investigated system and the most representative performance metrics correspondently evaluated. Computer(s) other than those controlling the switching systems are employed at this stage in order to ease the reproduction of proper environment. In addition, suitable circuitry is needed in order to synchronize load submission process and real-time system response. Problems and techniques related to artificial traffic production are considered as well as metrics selection and statistics collection.

PAT-APPL-6-216 715 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Improved Pseudo-Atmospheric Noise Generator with Control of Temporal Characteristics.
Patent Application,
Paul A. Singer, and Roger K. Cernius. Filed 15 Dec 80, 20p AD-D008 075/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved pseudo-atmospheric noise generator includes the capability for producing noise in the VLF/LF spectrum with known amplitude probability distributions while controlling the temporal characteristics of the simulated impulses. The outputs from a number of pseudo-random bit generators are selected by a microprocessor in accordance with expected or anticipated atmospheric disturbances from a number of geographical regions. The microprocessor selected outputs are fed to a digital-to-analog converter which feeds the converted signals to a summer. An independent Gaussian noise source is coupled to the summer and the outputs from the Gaussian noise source and the digital-to-analog converter are combined to create a composite pseudo-atmospheric noise signal. The improvement also includes capability for self-testing and set up. (Author)

PAT-APPL-6-216 878 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Adaptive Digital Communication System.
Patent Application,
Richard L. Gowan, and Harris A. Quesnell, Jr.
Filed 15 Dec 80, 11p AD-D008 066/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Variable rate, bidirectional digital communication is provided by an apparatus composed of a variable rate Manchester encoder/decoder coupled to a modulator which produces signals appropriate for transmission, and to a demodulator which extracts information from transmitted signals. (Author)

PB81-147621 PC **A08**/MF **A01**
Cincinnati Univ., OH.
Optical Communication Systems: Proceedings of the National Science Foundation Grantee-User Meeting on Optical Communication Systems Held at Cincinnati, Ohio on June 3-4, 1980,
J. T. Boyd. 1980, 175p NSF/RA-800366
Grant NSF-ENG76-17145
Prepared in cooperation with Battelle Columbus Labs., OH.

State-of-the-art developments in optical communication theory and devices were presented in eight technical sessions. Several major topics were covered: quantum and stochastic aspects of optical communications; atmospheric and fiber optical communications; guided wave optical devices (two sessions); semiconductor lasers and integrated optical device configurations; III-V compound devices; and optical devices such as infrared detectors and blue-green laser development for optical communications (two sessions). The proceedings include three to four technical papers presented in each of the sessions and a list of participants. About 70 representatives from industry, academia, and government took part in the sessions.

PB81-803157 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Frequency Synthesizers. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Feb 81, 216p
Supersedes PB80-801905, and NTIS/PS-78/1254.

Spread spectrum and single sideband communications, navigation, and frequency control are applications included in these Federally-sponsored research reports on frequency synthesizers. Methods and devices used include surface acoustic waves, digital control, number representation schemes, phase shift, cesium beam tubes, and phased locked systems. (This updated bibliography contains 221 citations, 15 of which are new entries to the previous edition.)

PB81-803165 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Frequency Synthesizers. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Feb 81, 216p
Supersedes PB80-801913, and NTIS/PS-78/1255.

Communications, radar, music synthesizers, frequency control, biomedical and test equipment, and microwave systems are applications of frequency synthesizers included in these research reports from worldwide literature. Methods and devices used include surface acoustic waves, phased locked systems, digital control, number representation schemes, and voltage controlled systems. (This updated bibliography contains 262 citations, 48 of which are new entries to the previous edition.)

PB81-803348 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.

Communication Satellite Technology. 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1980.
Feb 81, 67p
Supersedes PB80-803893. See also 1976, NTIS/PS-79/0332, 1977, NTIS/PS-79/0333, and 1978, NTIS/PS-79/0334. Sponsored by National Technical Information Service, Springfield, VA.

The cited articles from the international literature concern all aspects of communication satellite technology. Included are articles on Satellite Networks, data transmission efficiency, time division multiple access, data links, and phase shift keying. (Contains 239 citations)

17C. Direction Finding

AD-113 555/7 PC **A04**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Ground-to-Ground Tactical Intercept of S-Band Tracking Radars
Engineering rept.,
leo f. stinson, and daniel j. buckley. 15 Jun 56, 63p Rept no. E-1176
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

17D. Electromagnetic and Acoustic Countermeasures

AD-A093 766/4 PC **A04**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Experimental Tests of PTAPS Performance in Three Types of Production System Structures. An Investigation of the Compatibility of a Platform-Track Association Production Subsystem with STAMMER 1, STAMMER 2, and ROSIE.
Interim rept. FY80,
Robin A. Dillard. 17 Sep 80, 59p Rept no. NOSC/TD-385

The capability of a production system applied to Tactical System Assessment (TSA) is extended by adding a 'package' of system-logic rules, the Platform-Track Association Production Subsystem (PTAPS). PTAPS performs much of the logical reasoning needed to match tracks to specific platforms. This document illustrates the performance of PTAPS rules in three very different production system structures and discusses the efforts required to combine PTAPS rules compatibly with a much broader set of TSA rules. The PTAPS experiments described were run in INTERLISP programs on ARPANET hosts. (Author)

AD-A093 883/7 PC **A11**/MF **A01**
Telecommunications Associates, Fairfax, VA.
Novel ECCM Techniques for Army Tactical Communications.
Final rept. Jan-Jun 79,
Raymond L. Pickholtz, Hermann Helgert, Roger Lang, Laurence Milstein, and Ray Petit. 29 Jun 79, 237p Rept no. TA-79-2-3
Contract DAAB07-78-C-0174

Contents: Bit Error Rate Monitoring Using Extreme-Value Theory; Dynamic Allocation of Channel Capacity; Susceptibility Analysis of a Frame Synchronization Technique for Multichannel Frequency-Hopped BNCFSK Systems in Partial-Band Noise or CW-Tone Jamming; Low Rate Error Correcting Codes in Spread Spectrum Systems; Adaptive Null-Steering Arrays Transient Behavior; Modulation and Spreading Techniques; and Appendix A: Spread Spectrum Background--Frequency Hopping Systems.

AD-A094 002/3 PC **A04**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
The European Tactical Air Control System versus Communication Jamming.
Master's thesis,
Paul H. Miller. 6 Jun 80, 71p AD-E750 051

This study is an examination of how current close air support doctrine, when opposed by Soviet/Warsaw Pact radioelectronic combat capabilities, impacts the U.S. Air Force's ability to closely support the ground commander in Central Europe. Addressed are the current system for close air support, system-induced problems, enemy-induced problems, and several non-doctrinal recommendations for solutions to these problems. Recommendations developed include a change in command status of USAF close air support forces, expansion and modernization of our non-radio communications, and formation of an artillery/Combat Electronic Warfare and Intelligence team to counter the Soviet radioelectronic combat forces. (author)

AD-109 224/6 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Signal Density Study of S-Band Tactical Radars
MELVIN WEINER, and PEARY NELSON. Jul 56, 23p Rept no. tm m 1802
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-111 334/9 MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Field Test of Countermeasures Set, Electronic AN/MLQ-8 ( ) Fort Sill, Oklahoma, 20 March-6 April 55
HERMAN MENCHER, and MERLE BLASJO. Apr 56, 10p Rept no. er e 1171
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-301 969/2 PC **A03**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Preliminary Investigations of Mortar Shell Dispensed Chaff
Technical memo.,
margaretta stone. Dec 57, 34p Rept no. TM-M-1952
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-302 431/2 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Theoretical Effects of Radar Camouflage of Targets on Performance of Ground-Based Radars.
Technical rept.,
margaretta stone. 1 Aug 58, 24p Rept no. TR-1975
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-307 673/4 PC **A03**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Side-Lobe Repeater Study
JEREMY LIFSEY. Dec 58, 26p Rept no. tr2005
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

17E. Infrared and Ultraviolet Detection

AD-A093 483/6 PC **A06**/MF **A01**
Auburn Univ., AL. Engineering Experiment Station.
Automatic Handoff of Multiple Targets.
Final technical rept. 18 Dec 79-30 Sep 80 on Phase 1,
J. S. Boland, III, and H. S. Ranganath. 30 Sep 80, 123p AD-E950 071
Contract DAAH01-80-C-0258

In order to fully utilize the potential of the 'fire and forget' class of helicopter-borne missiles, it is necessary to solve the technical problems associated with acquiring and handing off multiple targets from a precision pointing and tracking system (PTS) to several missile seekers simultaneously or almost so in a short period of time. The multiple target problem is that of locating targets and missile seeker aim points within the PTS field of view, deciding which target is to be assigned to each missile, generating error signals to the torquers in order to slew the missile LOS such that its assigned target is in the center of its FOV, and initiating automatic seeker tracking. The task of locating a given smaller image within a larger image is known as 'image registration'. A detailed comparison of the important multiple image registration methods based on the number of arithmetic operations for software implementation and the complexity of hardware for real time implementation is presented. New methods of accomplishing multiple image registration which are computationally more efficient than the most commonly used template matching techniques (correlation and sequential similarity detection algorithm) are described. Conclusions and recommendations are given. (Author)

17G. Navigation and Guidance

AD-A093 448/9 PC **A07**/MF **A01**
IIT Research Inst., Annapolis, MD.
Analytic Determination of Interference Thresholds for Microwave Landing System Equipment and TACAN/DME Equipment.
Interim rept.,
Ved P. Nanda. Aug 80, 150p ECAC-PR-80-008, FAA-RD-80-89
Contracts F19628-78-C-0006, DOT-FA76WAI-612

This report analytically estimates the interference thresholds of the Time Reference Scanning Beam (TRSB) Microwave Landing System (MLS) which is comprised of the C-Band angle guidance and the L-Band PDME range guidance equipments. Furthermore, interference thresholds and separation distance requirements of the coexisting TACAN/DME L-Band equipment are determined. (Author)

AD-A093 449/7 PC **A06**/MF **A01**
IIT Research Inst., Annapolis, MD.
MLS Channel Assignment Model.
Interim rept.,
Thomas Hensler, and Andrew Koshar. Aug 80, 108p ECAC-PR-80-012, FAA-RD-80-91
Contracts F19628-78-C-0006, DOT-FA76WAI-612

An automated channel assignment model was constructed in response to an FAA need to assess the assignment feasibility of planned MLS angle-guidance equipment in C-band, and its associate L-band Precision Distance Measurement Equipment (PDME). The intersite interference analysis and channel-assignment algorithm capabilities are described. A trial assignment of MLS equipments was performed for a Southwest United States airport environment and the results are summarized. (Author)

AD-A093 487/7 PC **A06**/MF **A01**
Johns Hopkins Univ., Silver Spring, MD. Applied Physics Lab.
Fluidic Heading System Study: Summary Report.
Contractor rept.,
Abraham Finkel. Nov 80, 122p HDL-CR-80-384-1
Contract N00024-78-C-5384

The feasibility of incorporating a fluidic angular rate sensor into a vehicle heading sensor system is investigated. A heading sensor of this type would find application in armored vehicles where a magnetic compass cannot be used. The study covers system considerations, microprocessor-based computational requirements, and the effects of rate sensor errors. (Author)

AD-A093 553/6 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Microwave Landing System (MLS) Clearance Format Assessment Tests.
Data rept. Jan-Feb 80,

Robert McFadden. Dec 80, 54p Rept no. FAA-CT-80-46

The purpose of this experiment was to provide static and flight test data with the proposed Microwave Landing System (MLS) clearance format to support the MLS International Standards and Recommended Practices (SARPS) development by the International Civil Aviation Organization (ICAO) working group.

AD-A093 651/8 PC **A04**/MF **A01**
General Dynamics, San Diego, CA. Electronics Div.
Self-Referencing Guidance Interferometer.
Final rept.,
G. Tricoles, R. A. Hayward, and E. L. Rope. Jun 80, 52p Rept no. R-80-029-F
Contract N00019-79-C-0637

The concept of a Self-Referencing Interferometer: The term self-referencing interferometer describes a finite dielectric slab with sensors such as dipole antennas connected to detectors. More general structures are possible. For example, the dielectric can be a hollow shell, and the sensors might be antennas. However, flat dielectrics emphasize the physical basis. The essence of this interferometer is that an incident wave excites two coherent waves that have distinct propagation constants. (Author)

AD-A093 748/2 PC **A03**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC. Electronic Navigation Div.
DMAHTC's Support to National Ocean Survey LORAN C Charting,
John J. Speight, and Edwin O. Danford. Dec 80, 41p
Presented at the National Ocean Survey Hydrographic Survey Conference (8th).

The selection of LORAN-C as the primary Radionavigation System for the U.S. Coastal Confluence Zone requires by, joint agreement, that DMAHTC, USCG, and NOS provide corrections to LORAN-C Lattices overprinted on NOS Charts. This paper reviews the techniques used to compute these corrections. It also gives the status of the LORAN-C System. (Author)

AD-A093 749/0 PC **A02**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC. Electronic Navigation Div.
Production of LORAN-C Reliability Diagrams at the Defense Mapping Agency,
Clarence L. Worrell. 20 Nov 80, 11p
Presented at the Institute of Navigation National Marine Meeting, New Orleans, LA.

LORAN-C reliability diagrams depict two types of data: the maximum usable groundwave signal limit, which aids the LORAN-C user in determining which transmitters provide coverage in his area of operation, and the predicted uncertainty of a LORAN-C hyperbolic fix. Signal limits are computed using Bremmer's field prediction formula and an algorithm that predicts the range for a signal of predetermined signal-to-noise ratio propagating along an electrically inhomogeneous transmission path. Fix uncertainty predictions are based on a formula relating fix uncertainty to crossing angle between lines of position, system standard deviation, and the divergence of hyperbolic lines of position. Actual range and fix uncertainty may differ from values shown on reliability diagrams, depending on such factors as weather, the occurrence of geomagnetic disturbances, and the user's direction of travel. Reliability diagrams currently produced show signal limits and fix uncertainties for LORAN-C chains at a scale of 1:5,000,000; a new generation of reliability diagrams could show data at a reduced scale (1:10,000,000) for each LORAN-C triad (one master and two slave transmitters), making more chain and transmitter selection information available to the user.

AD-A093 750/8 PC **A02**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC.
Hydrographic Applications of the Global Positioning System,
Penny D. Dunn, and John W. Rees, II. Dec 80, 7p
Presented at the National Ocean Survey Hydrographic Survey Conference (8th).

Global Positioning satellites have been tested under a variety of conditions and demonstrated exceptional accuracy. The most portable of the Phase I development equipment is the manpack/vehicle user equipment (MVUE of manpack). The purpose of this study was to determine if a manpack is suitably accurate for large scale coastal hydrographic surveying. The manpack was placed aboard in the Naval Postgraduate School Research Vessel, R/V ACANIA. This objective required the testing of the manpack under varying survey conditions to determine the degradation of positional accuracy. The limit of the survey scale to which the unprocessed manpack data could be employed in a real-time operation was found to be 1:80,000 and smaller by the positioning error criteria of 0.5mm to the scale of the survey. Applications of differential techniques during the post-processing of the manpack position data increased the limit of the survey scale to 1:60,000 using the same position criteria.

AD-A093 774/8 PC **A05**/MF **A01**
Department of Transportation, Washington, DC. Office of the Assistant Secretary for Systems Development and Technology.
Federal Radionavigation Plan. Volume I. Radionavigation Plans and Policy.
Final rept. Dec 79-Jun 80.
Jul 80, 88p DOT-TSC-RSPA-80-16-VOL-1, DOD-4650.4-P-VOL-1
Supersedes report dated Nov 77, AD-A052 269.
See also Volume 2, AD-A093 775.

The Federal Radionavigation Plan (FRP) has been jointly developed by the U.S. Departments of Defense and Transportation to ensure efficient use of resources and full protection of National interests. The plan sets forth the Federal interagency approach to the implementation and operation of radionavigation systems. The Federal Radionavigation Plan delineates policies and plans for Government-provided radionavigation services. The document describes respective areas of authority and responsibility, and provides a management structure by which the individual operating agencies will define requirements and meet them in a cost-effective manner. It replaces the DOT National Plan for Navigation, and those sections of the DOD Joint Chiefs of Staff (JCS) Master Navigation Plan dealing with common user systems. Volume I is a summary document which delineates plans, policies, and authority and responsibility for providing radionavigation services. An integrated management plan describing how DOT and DOD will determine requirements and coordinate research, development, and implementation of radionavigation systems is provided in this volume.

AD-A093 775/5 PC **A03**/MF **A01**
Department of Transportation, Washington, DC. Office of the Assistant Secretary for Systems Development and Technology.
Federal Radionavigation Plan. Volume II. Requirements.
Final rept. Dec 79-Jun 80.
Jul 80, 50p DOT-TSC-RSPA-80-16-VOL-2, DOD-4650.4-P-VOL-2
See also Volume 3, AD-A093 776.

The Federal Radionavigation Plan (FRP) has been jointly developed by the U.S. Departments of Defense and Transportation to ensure efficient use of resources and full protection of National interests. The plan sets forth the Federal interagency approach to the implementation and operation of radionavigation systems. Volume II is devoted to the user requirements (civil and military) and the processes for determining them. Both general and specific requirements related to various applications and phases of navigation are discussed. Present and future anticipated needs are also addressed. The requirements of civil and military users defined in Volume II for radionavigational services are based upon the technical and operational performance needed for military missions, transportation safety, and economic efficiency.

AD-A093 776/3 PC **A03**/MF **A01**
Department of Transportation, Washington, DC. Office of the Assistant Secretary for Systems Development and Technology.
Federal Radionavigation Plan. Volume III. Radionavigation System Characteristics.
Final rept. Dec 79-Jun 80.
Jul 80, 46p DOT-TSC-RSPA-80-16-VOL-3, DOD-4650.4-P-VOL-3
See also Volume 1, AD-A093 777.

The Federal Radionavigation Plan (FRP) has been jointly developed by the U.S. Departments of Defense and Transportation to ensure efficient use of resources and full protection of National interests. The plan sets forth the Federal interagency approach to the implementation and operation of radionavigation systems. Volume III describes present and planned navigation systems in terms of nine major parameters: signal characteristics, accuracy, availability, coverage, reliability, fix rate, fix dimensions, capacity, and ambiguity. The volume addresses the characteristics, capabilities, and limitations of existing and proposed major radionavigation systems. All of the systems considered are defined in terms of system performance parameters which determine the utilization and limitations of the individual navigation system.

AD-A093 777/1 PC **A06**/MF **A01**
Department of Transportation, Washington, DC. Office of the Assistant Secretary for Systems Development and Technology.
Federal Radionavigation Plan. Volume IV. Radionavigation Research, Engineering and Development.
Final rept. Dec 79-Jun 80.
Jul 80, 120p DOT-TSC-RSPA-80-16-VOL-4, DOD-4650.4-P-VOL-4
See also Volume 1, AD-A093 774.

The Federal Radionavigation Plan (FRP) has been jointly developed by the U.S. Departments of Defense and Transportation to ensure efficient use of resources and full protection of National interests. The plan sets forth the Federal interagency approach to the implementation and operation of radionavigation systems. Volume IV is a summary of the Federal radionavigation R,E&D plan together with individual R,E&D plans for military and civil air, land, and marine applications. Open issues, and means for their resolution, are addressed. A key feature is a discussion on how the individual agency R,E&D plans will be coordinated to help assure that all aspects of each system are thoroughly evaluated while avoiding duplication of activities.

AD-A093 921/5 PC **A06**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Fleet Reliability Assessment Program. Volume 2A. Equipment Report CATCC-DAIR.
Final rept.
Sep 79, 106p
See also Volume 2B, AD-A093 922 and Volume 2, AD-A068 856.

The report contains a reliability assessment of data reported from three carriers. Data was accumulated over approximately a nine month period on the Carrier Air Traffic Control System with Direct Altitude Information readout features. The estimated MTBF was 661 hours based on 11,616 hours of operation. (Author)

AD-A093 936/3 PC **A04**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Airport Surveillance and Precision Approach Radar AN/GPN-24 Initial Evaluation Report, Dobbins AFB, Georgia, 3-19 September 1980.
Final rept.,
James R. Minsterl, and Merton E. Fisher. 15 Dec 80, 69p Rept no. 80/66R-232

This report presents data collected 3-19 September 1980 to define the capabilities and limitations of the radar facility at Dobbins AFB, Georgia. This report includes descriptions of the useable radar coverage and tracking capabilities, analysis of all flight and equipment performance data, and the performance predictions for the facility. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author)

AD-A093 956/1 PC **A02**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Precision Approach Radar, AN/FPN-62, Initial Evaluation Report, Pease AFB, New Hampshire, 10-15 October 1980.
Final rept.,
Jaime C. Caballero, Jr., and Kenneth B. Wright. 17 Dec 80, 24p Rept no. 80/66R-224

This report presents data collected 10-15 October 1980 to define the capabilities and limitations of the PAR facility at Pease AFB, New Hampshire. This report includes descriptions of the useable PAR coverage and tracking capabilities, analysis of all flight and equipment performance data, and the performance predictions for the system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author)

AD-A093 968/6 PC **A03**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Solid State Instrument Landing System Initial Evaluation Report, AN/GRN-29 Runway 16, McClellan AFB, California, 9-25 September 1980.
Final rept.,
Joseph P. Coyle, and Darrell W. Miller. 18 Nov 80, 36p Rept no. 80/66N-227

This report presents the results of the 9-25 September 1980 Traffic Control and Landing Systems (TRACALS) Evaluation of the McClellan AFB AN/GRN-29(V) SSILS serving Runway 16. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening, or operational use. (Author)

AD-A094 005/6 PC **A03**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Solid State Instrument Landing System Initial Evaluation Report, AN/GRN-29 Runway 34, McClellan AFB, California 9-25 September 1980.
Final rept.,
Joseph P. Coyle, and Rodney W. Rex. 18 Nov 80, 38p Rept no. 80/66N-228

This report presents the results of the 9-25 September 1980 Traffic Control and Landing Systems (TRACALS) Evaluation of the McClellan AFB AN/GRN-29(V) SSILS serving Runway 34. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performace until there is a significant change in ground equipment, siting environment, screening, or operational use. (Author)

AD-A094 016/3 PC **A04**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Solid State Instrument Landing System, AN/GRN-29(V) Runway 15 Initial Evaluation Report, Maxwell AFB, Alabama, 12-22 November 1980.
Final rept.,
Felix D. Young, and Gus E. Carroll. 19 Dec 80, 52p Rept no. 80/66N-237

This report presents the results of the 12-22 November 1980 Traffic Control and Landing Systems (TRACALS) Evaluation of the Maxwell AFB AN/GRN-29(V) SSILS serving Runway 15. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening, or operational use. (Author)

AD-A094 022/1 PC **A03**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
Evaluation of Navigation Systems during Trials Conducted on the USS SPIEGEL GROVE (LSD 32).
Final rept.,
Grant A. Rossignol. May 80, 26p Rept no. DTNSRDC/SPD-0943-03

This report presents the results of an evaluation of inertial navigation systems (INS) and a satellite navigation (SATNAV) system conducted during trials on the USS SPIEGEL GROVE (LSD 32). INS and SATNAV ship tracking data were compared to AERIS shore tracking data provided by the Naval Coastal Systems Center (NCSC). The results show that inertial navigation and SATNAV systems can provide an accurate and reliable method of obtaining ship tracking data independent of external equipment and operation area relative to shore. Experience gained during this evaluation should further improve the applications of INS and SATNAV tracking to future trials. Nothing in this report should be construed to be either a positive or negative endorsement of any specific hardware evaluated. (Author)

N81-14990/8 PC **A06**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Navstar Global Positioning System Applicability to the National Oceanic Satellite System.
G. A. Matchett. 25 Jul 80, 119p NASA-CR-160078, TR-3298
Contract NAS5-26128

This report presents the results of a preliminary investigation into the potential for applying NAVSTAR Global Positioning System (GPS) user equipment to the spacecraft of the National Oceanic Satellite System (NOSS). Two widely different navigation goals for NOSS spacecraft are examined: one being moderate accuracy, real-time navigation utilizing the simplest of GPS receivers, and the other being precision vertical displacement measurement over limited arcs utilizing specialized GPS equipment, possibly with ground data processing.

N81-14991/6 PC **A04**/MF **A01**
California Polytechnic State Univ., San Luis Obispo.
Flight Evaluation of the Terminal Guidance System.
D. R. Sandlin. 1981, 65p NASA-CR-163859
Grant NSG-4022

The terminal guidance system (TGS) is avionic equipment which gives guidance along a curved descending flight path to a landing. A Cessna 182 was used as the test aircraft and the TGS was installed and connected to the altimeter, DME, RMI, and gyro compass. Approaches were flown by three different pilots. When the aircraft arrives at the termination point, it is set up on final approach for a landing. The TGS provides guidance for curved descending approaches with guideslopes of 6 deg which required, for experienced pilots, workloads that are approximately the same as for an ILS. The glideslope is difficult to track within 1/2 n.m. of the VOR/DME station. The system permits, for experienced pilots, satisfactory approaches with a turn radius as low as 1/2 n.m. and a glideslope of 6 deg. Turn angles have little relation to pilot workload for curved approaches. Pilot experience is a factor for curved approaches. Pilots with low instrument time have difficulty flying steep approaches with small turn radius. Turbulence increases the pilot workload for curved approaches. The TGS does not correct to a given flight path over the ground nor does it adequately compensate for wind drift.

N81-14992/4 PC **A02**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Applicated Techniques for the Control of Approach Traffic.
A. Seyfried, M. Schubert, and U. Voelckers. Oct 79, 31p DFVLR-MITT-79-20
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-668).

The achievement of a regular distributed aircraft arrival rate at the TM borders and the smooth integration of different flows of traffic are the main objects of flow control in the approach area. With respect to these goals some fundamental flow control measures normally being applied in a selected near terminal area were investigated by the analysis of real traffic recordings as well as by controller interviews. The effects of certain flow control principles on the entry and exit distribution and on the further evolution of traffic within the TMA are explained. Finally it is discussed to which degree such different flow control techniques should be considered in a future computer assisted ATC system.

N81-14994/0 PC **A07**/MF **A01**
Lockheed-Georgia Co., Marietta.
Advanced Flight Deck/Crew Station Simulator Functional Requirements.
Final rept., Oct. 1979 - Feb. 1980.
R. L. Wall, J. L. Tate, and M. J. Moss. Dec 80, 145p NASA-CR-159331, LG80ER0035
Contract NAS1-15546

This report documents a study of flight deck/crew system research facility requirements for investigating issues involved with developing systems, and procedures for interfacing transport aircraft with air traffic control systems planned for 1985 to 2000. Crew system needs of NASA, the U.S. Air Force, and industry were investigated and reported. A matrix of these is included, as are recommended functional requirements and design criteria for simulation facilities in which to conduct this research. Methods of exploiting the commonality and similarity in facilities are identified, and plans for exploiting this in order to reduce implementation costs and allow efficient transfer of experiments from one facility to another are presented.

17H. Optical Detection

AD-A093 498/4 PC **A05**/MF **A01**
Institute for Research, State College, PA.
Concept Validation Combined Development Test and Evaluation/Operational Evaluation of the Compass Preview Test Bed (CPTB) System.
Final technical rept. Feb 78-May 80,
Paul C. Harrison. Nov 80, 83p RADC-TR-80-346
Contract F30602-78-C-0072

This document establishes a plan for the government conducted test of the Compass Preview Test Bed (CPTB) System. The test plan establishes the background and purpose of the test, the method of accomplishment, and general procedures for preparing and reviewing test reports. A six part annex establishes a plan for evaluating operational suitability and system software. A data management plan is also estblished for receipt, validation, reduction, retention, processing, and analysis of all data collected during the test. AFM 55-43 was used as a guide in establishing the format of this test plan. (Author)

AD-A093 889/4 PC **A05**/MF **A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
User's Guide for Passive Target Acquisition Program Two (PTAP-2).
Final rept.,
Walter B. Miller. Jun 80, 85p Rept no. ERADCOM/ASL-TR-0060

A compilation of user information is offered for the software package, Passive Target Acquisition Program 2. Included are microcomputer specifications, general operating instructions, descriptions of special options, operating hints, and a complete listing of all programs. Examples are given to cover all phases of program operation, and contents are arranged to provide a continuous progression through the entire program set. (Author)

AD-A094 008/0 PC **A05**/MF **A01**
Honeywell Systems and Research Center, Minneapolis, MN.

Advanced Target Tracker Concepts.
Quarterly progress rept. no. 2, 29 Dec 79-30 Mar 80,
P. M. Narendra, and B. L. Westover. Apr 80, 90p Rept no. 80SRC47
Contract DAAK70-79-C-0150

Conventional target tracking approaches rely on numerical correlation over successive frames on a window around the target. They are therefore sensitive to partial obscuration and changes in target and background appearances. Furthermore, multiple-target tracking requires replication of the hardware. In this report, we present the development of a multiple-target tracking approach based on a dynamic scene model derived from the analysis of a time sequence of imagery. Simulation results demonstrate multiple-target tracking in cluttered backgrounds and in imagery from fast-moving platforms. The approach can be implemented as an integral part of the Honeywell target screener system. (Author)

AD-A094 023/9 PC **A07**/MF **A01**
Systems Research Labs., Inc., Dayton, OH.
SAM System Performance Evaluation: E-O Data for Human Operator Model Development.
Technology rept.,
Evan P. Rolek. Nov 80, 127p AFAMRL-TR-80-118
Contract F33615-79-C-0500

A simulation experiment was performed to collect data on the performance characteristics of human operators tracking an aircraft using an electrooptical (TV) tracking system. Two teams were used in the study, each consisting of an azimuth tracker and an elevation tracker. The target aircraft's trajectory was one of five different flight profiles. Performance metrics consisted of angular tracking error in azimuth and elevation. Analysis of variance and Tukey tests were the primary statistical analysis techniques. All tracking errors were relatively low but statistical significance was obtained for trajectory differences, team differences, session effects, and team by session interactions. These data will be used to develop models of the human operators to be included in attrition models such as TAC ZINGER. In this way, Air Force researchers and strategists will be able to obtain engagement data, such as miss-distance and PK, when the threat system is operating in manual modes in addition to the automatic modes currently included in these models. (Author)

17I. Radar Detection

AD-A093 493/5 PC **A09**/MF **A01**
Atlantic Research Corp., Rome, NY.
Space-Based Radar Array System Simulation and Validation.
Interim rept. 7 Mar 79-7 Mar 80,
Harvey K. Schuman, Donald R. Pflug, and Larry D. Thompson. Sep 80, 176p RADC-TR-80-294
Contract F30602-79-C-0116

The simulation theory and software implementation for a space-based radar RF lens are described. Infinite array theory and moment methods are used to simulate the mutual coupling among the wire radiators on each lens array face, 'feedback' coupling from the nonilluminated array to the illuminated array, active progressively phased modules interconnecting the arrays, and arbitrarily shaped thin wire radiating elements. Edge effects are accounted for by iterative techniques. Active impedances, element currents, and power gain patterns are computed. (Author)

AD-A093 499/2 PC **A18**/MF **A01**
University Coll., London (England). Dept. of Electronic and Electrical Engineering.
Design Considerations for Phased Array Modules.
Final technical rept. 1 Mar 77-30 Sep 79,
John R. Forrest, J. Austin, A. A. de Salles, and J. G. Schoenenberger. Nov 80, 416p RADC-TR-80-354
Grant AFOSR-77-3238

The report describes work carried out on the design of X-Band (10GHz) transmit/receive modules for use in active phased array radar. A heterodyne phase locked loop is used to synchronize the r.f. source in each module to a common reference. Beam steering for an array of modules is accomplished by phase shifting the intermediate frequency reference to each module, thus avoiding the use of microwave phase shifters. An eight element array of modules was constructed and beam steered radiation patterns are given in the report. A particularly simple digital control and monitoring system for the i.f. phase shifters is described. Finally, the design and construction of the modules in microwave integrated circuit form with 10W pulsed Gunn diodes is described. (Author)

AD-A093 638/5 PC **A03**/MF **A01**
Communications Research Centre, Ottawa (Ontario).
Theory of Conical-Scan Radars for Low-Angle Tracking.
J. Litva. Aug 80, 37p Rept no. CRC-1336

In this report, a description of the tracking behavior of conical-scan radars with low-angle targets is presented. To begin, an equivalence is established between monopulse and conical-scan radars. Transformations are then developed from this equivalence, which permit one to treat a conical-scan radar as an equivalent monopulse radar. An example is given of the use of these transformations for simulating the low-angle tracking behavior of conical-scan radars. The simulated result is compared with a low-angle conical-scan radar measurement. Since approximations are made in developing the theory presented in this report, a discussion is given on the range of tracking parameters for which the theory is valid. (Author)

AD-A093 662/3 PC **A04**/MF **A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Passive Target Detection Measurements at 220 GHz.
Interim technical rept.,
M. L. Foster, R. E. Forsythe, J. M. Welch, and J. M. Schuchardt. Aug 80, 64p
Contract DAAK70-79-V-0108

Passive target signature measurements were performed at 220 GHz and 95 GHz. Test results show target detection is possible even with very warm sky temperatures. A 220 GHz/94 GHz sensor was used to detect a metallic vehicle at a range of 300 meters during the summer. Using a raster scan format, scans were made above, through and below the target. The scene thus viewed included trees and grass. Measurements were also made of the overhead sky and calibrated hot and cold radiometer loads.

AD-A093 690/6 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
The Shift and Scale Invariant Fourier-Mellin Transform for Radar Applications.
Project rept.,
Lyle H. Johnson. 14 Oct 80, 55p RST-5, ESD-TR-80-197
Contract F19628-80-C-0002

Automatic classification of targets viewed by radar is complicated by variations in target aspect relative to the radar line-of-sight (RLOS). This report investigates the possibility of reducing the effects of target aspect by using the scale invariance of the Mellin transform. The properties of the Mellin transform are developed in analogy with the Fourier transform and illustrated using simple test functions and digitally implemented transforms. Simulated radar ship profiles demonstrate that a change in aspect is not equivalent to a change in target scale for realistic targets, however. Automatic classification results, for both simulated and actual radar ship profiles, confirm that using a combination Fourier-Mellin transform for feature selection appears at best comparable to the results obtained using the Fourier transform alone for feature selection. (Author)

AD-A093 691/4 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Registration Errors in a Netted Air Surveillance System.
Technical note,
William L. Fischer, Charles E. Muehe, and Alan G. Cameron. 2 Sep 80, 83p TN-1980-40, ESD-TR-80-169
Contract F19628-80-C-0002

Today's tactical military air surveillance radars generally operate in a stand-alone configuration. The many performance improvements that result when data from multiple radars of this type are merged have made such netted operations an attractive goal for many years. A major obstacle to achieving this goal has traditionally been the difficulty associated with the registration of multisensor data, the expression of the data in a common coordinate system free from errors due to site uncertainty, antenna orientation, and improper alignment. This report presents the results of a modest effort to develop a self-registration procedure by which multiple radar sensors operating in consort each calculate the errors in their data by comparing it with data from the remainder of the system and then uses the information to upgrade performance. The technique has been tested with experimental data and appears quite capable of improving system performance, measured in terms of residual inter-site bias errors, by almost a factor of one hundred. (Author)

AD-A093 967/8 PC **A03**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Gapfiller Radar AN/GPN-25 Initial Evaluation Report, Tolicha Peak, Nevada, 9 June - 7 July 1980 and 25-30 August 1980.
Final rept.,
Noel H. Benner, and George R. Hurd. 19 Dec 80, 31p Rept no. 80/66R-233

This report presents data collected 9 June - 30 August 1980 to define the capabilities and limitations of the radar facility at Tolicha Peak, Nevada. This report includes descriptions of the useable radar coverage and tracking capabilities, analysis of all flight and equipment performance data, and performance predictions for the system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author)

AD-B004 290/3 PC **A03**/MF **A01**
Air Force Cambridge Research Labs., Hanscom AFB, MA.
Aircraft and Radar Weather Data, Analysis for PVM-5, AFCRL/Minuteman Report Number 1.
Air Force surveys in geophysics,
Arnold A. Barnes, Jr., James I. Metcalf, and Loren D. Nelson. 23 Dec 74, 44p Rept nos. AFCRL-AFSG-297, AFCRL-TR-74-0627
Distribution limitation now removed.

Aircraft and radar weather data recorded for support of the Minuteman PVM-5 test are presented. The link-offset mode was used successfully to obtain radar data for correlation with the aircraft data. The correlation data were quite good, and provided usable relations of reflectivity factor (Z) and water content (M) on five of nine passes. Application of the Z-M relations to the reflectivity data recorded along the re-entry trajectories provided estimates of the water content profile and the weather severity index (WSI) for each of the trajectories. (Author)

AD-108 891/3 PC **A03**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Portable Crystal Video Directional Receiving Equipment
ANTHONY DIGIACOMO. Dec 54, 26p Rept no. tm m 1617
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-149 439/2 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
A Method of Locating Nuclear Detonations
WALTER PRESSMAN, and MURRAY MILLER. Jun 57, 8p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-149 444/2 PC **A02**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Some Advances in High Resolution Radar and Radiometry
H.N. TATE. 1957, 8p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

PAT-APPL-6-219 662 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Radar Tracking System.
Patent Application,
Dean D. Howard. Filed 23 Dec 80, 10p AD-D008 073/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A monopulse radar tracking system having clutter reduction capability. The sampled three-coordinate video data is time-averaged before being processed in the digital control processor that computes azimuth and elevation error to control the antenna for proper positioning. (Author)

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

IAEA-NDS-AM-1 PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). Nuclear Data Section.
Description of Card Input Data and Formats for the International Bulletin on Atomic and Molecular Data for Fusion.
K. Katsonis, and F. J. Smith. May 79, 40p
U.S. Sales Only.

This document describes the input data and the corresponding format of the computer programme which is used by the Atomic and Molecular Unit of the IAEA for storing, compiling and retrieving numerical data and/or bibliographic information for publishing the International Bulletin on Atomic and Molecular Data for Fusion. (Atomindex citation 11:526120)

IAEA-NDS-AM-3 PC **A04**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). Nuclear Data Section.
Variable Length Record Format Used to Store the Index to Atomic and Molecular Data for Fusion.
R. E. Seamon, F. J. Smith, and J. Rumble. Sep 79, 73p
U.S. Sales Only.

This document describes records' formats which are used to store the Index to atomic and molecular data for fusion-prepared by the Nuclear Data Section of the IAEA. (Atomindex citation 11:526122)

JAERI-M-8420 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
One-Dimensional Transport Code for Tokamak Plasmas, (1).
T. Amano, and M. Okamoto. Sep 79, 50p
In Japanese.
U.S. Sales Only.

A one-dimensional tokamak transport code was developed, which covers neutrals, impurity, NBI and alpha particle heating. Basic parts of the code are described in detail, including the simulation model, the numerical method, and the usage of the code. Results of the test run are also given. (Atomindex citation 11:526132)

LBL-11146 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Heavy Ion Inertial Fusion.
D. Keefe, and A. M. Sessler. Jul 80, 12p CONF-800740-24
Contract W-7405-ENG-48
11. international conference on high energy accelerators, Geneva, Switzerland, 7 Jul 1980.

Inertial fusion has not yet been as well explored as magnetic fusion but can offer certain advantages as an alternative source of electric energy for the future. Present experiments use high-power beams from lasers and light-ion diodes to compress the deuterium-tritium (D-T) pellets but these will probably be unsuitable for a power plant. A more promising method is to use intense heavy-ion beams from accelerator systems similar to those used for nuclear and high-energy physics; the present paper addresses itself to this alternative. As will be demonstrated the very high beam power needed poses new design questions, from the ion source through the accelerating system, the beam transport system, to the final focus. These problems will require extensive study, both theoretically and experimentally, over the next several years before an optimum design for an inertial fusion driver can be arrived at. (ERA citation 06:006795)

N81-15830/5 PC **A02**/MF **A01**
Nagoya Univ. (Japan).
Heating of Toroidal Plasmas in Universities in Japan.
H. Ikegami. Nov 80, 16p IPPJ-492
Presented at Second Joint Grenoble-Varenna Intern. Symp. On Heating on Toroidal Plasmas, COMO, Italy, 3-12 Sep. 1980.

Experimental investigations of toroidal plasma heating are reviewed. In particular, three major activities are described: the Nagoya Bumpy Torus (NBT) and JIPP T-2, stellarator tokamak hybrid, and Heliotron-E. Ion cyclotron heating (ICH) is studied on NBT where impurity oxygen ions are observed to increase in temperature from 10 eV to approximately 60 eV with 80 kW input when ICH is turned to protons. Provided Coulomb collisions for energy transfer between the proton and the oxygen ion, the proton temperature is estimated to be as high as 200-300 eV. Lower hybrid setting (LHH) and neutral beam injection (NBI) is examined on JIPP T-2, showing the heating efficiency of 1 eV/kW for LHH up to 120 kW and approximately 2 eV/kW for NBI up to 50 kW. The stellarator configuration is observed less efficient in heating because of a larger loss region due to helical ripples. Electron cyclotron heating is applied to NBT and JIPP T-2. A turbulent heating experiment on TRIAM-1 tokamak shows that the bulk ions are heated from 140 eV to 240 eV within 200 microsec. It is observed that the heated electrons remain only within the plasma surface of 1 cm thickness continuing for 500 microsec.

N81-15831/3 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Preionization and Heating of Plasma at the Electron Cyclotron Frequency in Jipp T-II Stellarator.
K. Ohkubo, K. Kawahata, K. Matsuoka, N. Noda, and K. Sakurai. Nov 80, 20p IPPJ-489

Experimental studies of electron cyclotron preionization and heating are carried out in JIPP T-2 torus by injecting a power of 36 kW at the frequency of 35.5 GHz. Preionization effectively decreases the loop voltage required to start a joule heating and eliminates strong spikes in the signals of electron density, light emission as well as hard X ray which are due to runaway electrons at the initial breakdown phase of joule heating. Experiments on electron cyclotron heating of stellrator plasmas in ordinary modes show a heating frequency of 1.6 eV/kW, and the absorption rate of microwave power is estimated to be around 50 percent from power balance.

N81-15833/9 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Numerical Analysis of Sawtooth Oscillation in Low-Q Diva Experiment.
T. Amano, M. Okamoto, and K. Shimizu. Nov 80, 10p IPPJ-490

A simple model is established for the rising phase of sawtooth oscillation and internal disruption in order to simulate whole sawtooth oscillation in tokamaks on the diffusion time scale. The model is incorporated into a tokamak one dimensional transport code and is applied to the DIVA low q experiment. The period and amplitude of sawtooth oscillation are calculated and the comparison is made between the experiment and simulation.

SLAC-PUB-2611 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Up/down Fusion and Fission.
F. F. Hall. Sep 80, 4p CONF-801210-2
Contract AC03-76SF00515
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 15 Dec 1980.

A brief review of the technology of fusion and fission programs is given. Some of the problems associated with each are described. Some recommendations for the programs are included. (ERA citation 06:003280)

UCRL-83743 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Nonlinear Behavior of Stimulated Scatter in Large Underdense Plasmas.
W. L. Kruer, and K. G. Estabrook. 5 Nov 79, 19p CONF-791109-5
Contract W-7405-ENG-48
Workshop on laser interaction, Rochester, NY, USA, 5 Nov 1979.

Several nonlinear effects which limit Brillouin and Raman scatter of intense light in large underdense plasmas are examined. After briefly considering ion trapping and harmonic generation, we focus on the self-consistent ion heating which occurs as an integral part of the Brillouin scattering process. In the long-term nonlinear state, the ion wave amplitude is determined by damping on the heated ion tail which self-consistently forms. A simple model of the scatter is presented and compared with particle simulations. A similar model is also applied to Raman scatter and compared with simulations. Our calculations emphasize that modest tails on the electron distribution function can significantly limit instabilities involving electron plasma waves. (ERA citation 06:006798)

18B. Isotopes

AECL-6576 PC **A05**/MF **A01**
Atomic Energy of Canada Ltd., Ottawa (Ontario).
Annual Report, 1978-1979.
1979, 92p AECL-6576F
U.S. Sales Only.

Activities of AECL for the year ending March 31, 1979 are described. Progress in research, production and marketing of radioisotopes, heavy water manufacture, and construction of CANDU reactors is discussed. The company was restructured in 1978. Hearings on nuclear issues meant that more attention was paid to public affairs. A financial statement is included. (Atomindex citation 11:526149)

PAT-APPL-6-206 403 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Method for the Separation of Uranium Isotopes.
Patent Application,
Abraham Auerbach. Filed 3 Nov 80, 11p AD-D008 071/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for the separation of uranium isotopes, particularly U235 is disclosed. The method em-

ploys a frequency selective laser irradiation of an adiabatically cooled beam of UF6 molecules, followed by the 'chemionization' i.e., SbF5 + UF6 SbF6(-) + UF5(+) of the selectively irradiated UF6 molecules, and finally separates the favored U235F5(+) product. (Author)

18C. Nuclear Explosions

AD-A093 517/1 PC **A09**/MF **A01**
Colorado Div. of Highways, Denver.
Estimates of Thermal Radiation Environments got Planning a Thermal Simulation on a HE Test.
Final rept. 17 Apr-31 Dec 78,
Burton S. Chambers, III, and John A. Hasdal. 30 Mar 79, 200p SAI-80-700-AQ, DNA-5073F
Contract DNA001-78-C-0204

Data and guidelines were developed that will assist future experimental planning of a thermal radiation and airblast high explosive event. Estimates of nuclear radiation environments that are to be simulated in the event are made, and placement of the SAI thermal radiation devices are considered in the context of an airblast environment. The results are expected to help guide subsequent test planning. (Author)

AD-A093 882/9 PC **A05**/MF **A01**
Applied Research Associates, Inc., Albuquerque, NM.
Basic Mechanisms of Spall from Near-Surface Explosions.
Final rept. 1 Apr-31 Oct 80,
Douglas H. Merkle. 30 Nov 80, 96p AFOSR-TR-80-1379
Contract F49620-80-C-0059

The current state of the art on explosion-induced spall in geologic materials is examined, with emphasis on spall in soil due to near surface explosions. At present there is neither a generally accepted, precise, technical definition of, nor a generally accepted technique for predicting explosion-induced spall in soil. Several mechanisms can cause spall in soil, and the key to a better understanding of soil spall is a better understanding of soil tensile stress-strain behavior. (Author)

AD-338 333/8 PC **A08**/MF **A01**
Defense Atomic Support Agency, Washington, DC.
OPERATION CASTLE. PROJECT 6.2a. BLAST AND THERMAL EFFECTS ON B-36 AIRCRAFT IN FLIGHT
G.C. Miller, E.J. Schlei, and C.R. Andrews. Jun 56, 166p DASA-WT925
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The responses of a B-36 aircraft to the effects of a nuclear detonation at levels approaching the thermal and blast limitations of the aircraft were determined. A B-36D aircraft was instrumented and flown in the vicinity of each of the six shots of the CASTLE sequence. Time-history input and response measurements constituted the main instru mentation effort. For the first five shots, the aircraft was positioned at predicted near-limiting inputs in a simulated delivery configuration, that is, flying away from the explosion. On Shot 6, the aircraft was headed toward the ex plosion to obtain initial experimental data for this orientation. In addition to the measured data, together with photographs and descriptions of the damage, this report contains pertinent ob servations as reported by the flight crew. Suf ficient dre obtained to fulfill the specific objective of the project. A comparison between the experimental data and theoretically-predicted responses is made. (Author)

AD-341 055/2 PC **A03**/MF **A01**
Army Electronics Labs., Fort Monmouth, NJ.
Gamma Radiation Exposure
Rept. for Mar-May 54,
R.H. Dempsey, baraff Larrick, G.A., and O.E. Johnson. 16 Mar 59, 44p DASA-WT912
Report on Operation Castle Proj. 2.1 (U).
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The initial- and residual-gamma radiation ex posures resulting from the surface detonation of megaton-yield-range thermonuclear devices were recorded in order to provide data for the determination and evaluation of the gamma-radi ation hazards associated with such bursts. The following types of dosimeters were used as gamma radiation detectors: photographic, chemical, and Radiac Set AN/PDR-39. Instrument shelters were installed on reef, beach, and land locations to enable differentiation between initial- and residual-gamma exposures. Gamma-radiation ex posure measurements were made at known distances from ground zero for each of five shots. The initial-gamma data has limitations; the bulk of the data was completely lost due to the destruc tion of most of the initial-gamma stations. A comparison of the fragmentary initial-exposure data with scaled data shows reasonable agreement, although there is an insufficient quantity of data to analyze for effective mean free paths. (Author)

AD-357 967/9 PC **A05**/MF **A01**
Naval Radiological Defense Lab., San Francisco, CA.
Ship-Shielding Studies
H. R. Rinnert. 5 Jul 59, 92p AEC-WT-1321
Report on Operation Redwing-Proj. 2.71 (U).
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The principal objectives of this project were to determine, for the types of nuclear detonations encountered during Operation Redwing, (1) the relative gamma radiation fields resulting from radioactive contaminants on a ship's weather surfaces, in the surrounding air envelope, and in the surrounding water envelope as a function of time and (2) characteristics of the interaction of gamma radiation with steel as a function of thickness and time after detonation. Shielded recording gamma-radiation detectors of known geometry were located on two YAG's to permit discrimination between the radiation fields resulting from water-borne and airborne activities only. Unshielded detectors supplied data on the overall radiation fields on the weather decks. Recording radiation detectors inclosed in steel cylinders of various thicknesses supplied combined absorption and multiple scattering data as a function of time after detonation. (Author)

AD-361 766/9 PC **A03**/MF **A01**
Naval Ordnance Lab., White Oak, MD.
Base Surge Measurements by Photography,
Richard L. Willey, George A. Young, and C. J. Aronson. Sep 55, 34p NOLR-1199, AEC-WT-903
Report to the Scientific Director on Operation Castle, Pacific Proving Grounds, Project 1.1c. (U)
Distribution limitation now removed.

The major objective of Project 1.1c was the study of base surge phenomena on the Operation CASTLE shots by means of photography. No pictures of base surges were obtained, but aerial photographs for other projects indicated that base surges might have formed at times when the illumination was inadequate for surface photography. This cannot be established with certainty. Radar scope photography proved to be useful for indicating the region of heavy fallout. Further studies of this type would be recommended only for tests conducted during daylight hours. (Author)

AD-361 772/7 PC **A04**/MF **A01**
Evans Signal Lab Belmar N J
Effects of Nuclear Detonations on the Ionosphere
Fred B. Daniels, and Arthur K. Harris. 22 May 57, 75p AEC-WT-929
Report on Operation Castle--Project 6.6. (U)
Distribution limitation now removed.

During Operation CASTLE, two ionosphere recorders were operated in the Marshall Islands -at Site Elmer, about 200 miles west of Bikini Atoll, and at Rongerik Atoll, about 150 miles east of Bikini -- in order to study the effects of the detonations on the ionosphere. Severe absorption was observed 200 miles west of all multimegaton shots, lasting several hours, presumably due to ionization caused by radioactive material carried by high-level winds. Turbulence in the E region after each major shot was indicated by the diffuse sporadic-E returns at Rongerik. Ionospheric disturbances were found up to 2,600 miles away, with indicated velocities of about 8 to 16 km/min. (Author)

AD-361 832/9 PC **A03**/MF **A01**
Strategic Air Command, Offutt AFB, NE.
Test of Interim Ibda Procedures.
Rept. for Mar-May 54,
Rockly Triantafellu. Jan 56, 44p AEC-WT-924
Report on Operation Castle, Project 6.1. (U)
Distribution limitation now removed.

The objective of Project 6.1 (CASTLE) was to determine whether the equipment-operating procedures used in obtaining radar scope photos for IBDA (Indirect Bomb Damage Assessment) of previous A-bomb tests were valid for thermonuclear weapons. The procedures for obtaining the radar photos involved positioning of bombers at a safe distance from ground zero at operational altitudes, with radar scanning ground zero during, and immediately after, the weapon burst. The photography obtained on each shot was generally good. The conclusions are that a high yield weapon burst can be readily detected by the bomber's radar, and that present equipment-operating techniques are adequate. These conclusions must be qualified. (Author)

AD-361 836/0 PC **A08**/MF **A01**
Naval Radiological Defense Lab., San Francisco, CA.
Distribution and Intensity of Fallout.
Final rept.,
R. L. Steton, E. A. Schuert, W. W. Perkins, T. H. Shirasawa, and H. K. Chan. Jan 56, 172p AEC-WT-915
Report on Operation Castle, Project 2.5a. (U)
Distribution limitation now removed.

The objective of this project was to document the distribution and intensity of fallout from all shots at Operation CSTLE. Data were obtained for Shots 1, 2, 3, 4, and 6 by use of land stations, anchored lagoon stations, and free-floating sea stations. A complete analysis of the Shot 1 fallout to 300 nautical miles downwind including the development of an experimental model based on fallout particle trajectories is presented as well as data on Shot 2 fallout to 50 nautical miles downwind and the close-in fallout from Shots 3, 4, and 6. (Author)

AD-362 109/1 PC **A05**/MF **A01**
Naval Radiological Defense Lab., San Francisco, CA.
Shipboard Radiological - Countermeasure Methods
R. H. Heiskell, R. H. Black, R. J. Crew, R. K. Fuller, and F. K. Kawahara. 30 Jan 59, 86p AEC-WT-1322
Report on Operation Redwing - Project 2.8 (U).
Distribution limitation now removed.

Various test surfaces and specimens were exposed on YAG-39 and YAG-40 to fallout from Shots Zuni, Flathead and Tewa. Contaminability-decontaminability (C-D) studies were conducted when the ships returned to Eniwetok Lagoon. Three days after Zuni the average reading in the nonwashdown area of the YAG-40 was approximately 350 mr/hr and in the washdown area approximately 90 mr/hr. When the decontamination studies were initiated, the average levels after Flathead were lower than those after Zuni by a factor of 10. The average nonwashdown reading was 35 mr/hr and the washdown reading, 10 mr/hr. The removal of the removable radiological protective coating (RRPC) after Zuni in the nonwashdown area removed all but 0.5 to 8.0% of the contaminant, while firehosing alone left a residual of 6 to 28%. (Author)

18D. Nuclear Instrumentation

IDO-12091 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Statistical Analysis of the Calibration Procedure for Personnel Radiation Measurement Instruments.
W. J. Bush, S. J. Bengston, F. L. Kalbeitzer, J. P. Cusimano, and V. P. Gupta. Nov 80, 75p

Contract AC07-76ID01570

Thermoluminescent analyzer (TLA) calibration procedures were used to estimate personnel radiation exposure levels at the Idaho National Engineering Laboratory (INEL). A statistical analysis is presented herein based on data collected over a six month period in 1979 on four TLA's located in the Department of Energy (DOE) Radiological and Environmental Sciences Laboratory at the INEL. The data were collected according to the day-to-day procedure in effect at that time. Both gamma and beta radiation models are developed. Observed TLA readings of thermoluminescent dosimeters are correlated with known radiation levels. This correlation is then used to predict unknown radiation doses from future analyzer readings of personnel thermoluminescent dosimeters. The statistical techniques applied in this analysis include weighted linear regression, estimation of systematic and random error variances, prediction interval estimation using Scheffe's theory of calibration, the estimation of the ratio of the means of two normal bivariate distributed random variables and their corresponding confidence limits according to Kendall and Stuart, tests of normality, experimental design, a comparison between instruments, and quality control. (ERA citation 06:006431)

INIS-mf-5660 PC **A04**/MF **A01**
Universidad Nacional Autonoma de Mexico, Mexico City. Facultad de Ciencias.
Design and Construction of a exp 10 B Coated Ion Chamber for the Measurement of a Thermal Neutron Flux.
M. Vite T. 1979, 65p
In Spanish.Thesis.
U.S. Sales Only.

A model of an ionization chamber cover with exp 10 B, for the measurement of thermal neutron flux is presented, the developed chamber is made of a cylindrical vessel in which interior exist 7 aluminium electrodes which by electrodeposition were covered with a coat of exp 10 B with a thickness of 0.68 mg/cm exp 2 . Once the chamber is filled with N sub 2 to a pressure of 1.33 atm., it was exposed to a flux of thermal neutrons at the order 10 exp 4 n/cm exp 2 -seg obtaining an ionization current of 10 exp -11 amp. which can be easily distinguished from the leak current which order is of 10 exp -12 amp. The conventional electronics associated to the chamber allows to process the ionization current in pulse form. The relation of noise to signal is approximately of 8, for which the pulses can be differentiated from the electronic noise without any problem. (Atomindex citation 11:541478)

JAERI-M-8425 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Basic Characteristics of Gas Counters for Heavy Ion Nuclear Reactions.
A. Shibuya, and E. Takekoshi. Sep 79, 31p
In Japanese.
U.S. Sales Only.

To reveal basic characteristics of gas counters for heavy ion nuclear reactions, a delta E - E telescope and a parallel plate avalanche counter, operating at low gas pressures of $<=100$ torr, were constructed and examined with a exp 241 Am alpha source. For the telescope, the intrinsic resolution of delta E and the energy loss straggling, associated with gas pressure, were obtained and compared with the calculated values by Tschalaer's theory. For the avalanche counter with the electrodes consisting of 30 mu g / cm exp 2 polypropylene stretched film, a time resolution of 170 ps and a position resolution of 0.5 mm were obtained. (Atomindex citation 11:541916)

NUREG/CP-0016 PC **A08**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Reactor Safety Research.
Proceedings of the U.S. Nuclear Regulatory Commission Meeting on Reactor Vessel Liquid Level Measurement Held at Gaithersburg, Maryland on October 30, 1980,
N. N. Kondic. Jan 81, 175p

The Three Mile Island accident focused attention on the importance of monitoring liquid inventory within the reactor vessel of nuclear power plants. Subsequently, the NRC issued a requirement that all commercial plants be equipped with some means of measuring this parameter by January 1982. By NRC invitation, representatives of national laboratories, universities and industry met to discuss various techniques of liquid level and liquid inventory measurement which might be amenable to the operating conditions of PWR plants. The proceedings of this meeting, contained in this report, represent a state-of-the-art review of this subject. This review now serves as a framework for detailed feasibility studies and proof tests of techniques for measuring reactor vessel liquid inventory.

N81-15038/5 PC **A02**/MF **A01**
Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazoni.
Anti-Compton System for High Sensibility gamma Spectrometry.
M. C. Azzolini. 5 Nov 79, 19p ISS-P-79/12, ISSN-0390-6469
In Italian; English Summary.

The acquisition system is described for gamma spectrometer which is based on a Ge(Li) detector, and endowed with a coincidence/anticompton system realized with an annular geometry NaI (Tl) scintillator. The purpose of the instrument is to identify small quantities of radionuclides in environmental samples.

PB81-857914 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Spark Chambers. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 118p

Research, studies, and applications of spark chambers in spectrometers, streamer chambers, optical telescopes, biomedical engineering, electronics, and physics are contained in this bibliography. Topics include wide gap spark chambers, high resolution cryogenic spark chambers and spark chambers for high magnetic fields. (Contains 115 citations, fully indexed and including a table of contents.)

PB81-857922 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Spark Chambers. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 205p

Research, studies, and applications of spark chambers in spectrometers, streamer chambers, optical telescopes, biomedical engineering, electronics, and physics are contained in this bibliography. Topics include wide gap spark chambers, high resolution cryogenic spark chambers, and spark chambers for high magnetic fields. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-857930 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Spark Chambers. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 185p

Research, studies, and applications of spark chambers in spectrometers, streamer chambers, optical telescopes, biomedical engineering, electronics, and physics are contained in this bibliography. Topics include wide gap spark chambers, high resolution cryogenic spark chambers and spark chambers for high magnetic fields. (Contains 200 citations, fully indexed and including a table of contents.)

SLAC-PUB-2626 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Modular Stand-Alone Monitor and Control System (SAMAC).
J. Kieffer. Oct 80, 5p CONF-801103-16
Contract AC03-76SF00515
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

Large high energy physics experiments require constant monitoring and control of the numerous components of the particle detector apparatus. This paper describes a basic hardware configuration which has been designed to satisfy the monitoring and control requirements of the many different experimental setups. The system is designed to operate in the stand-alone mode, and may be interfaced to a host computer via CAMAC. The entire system is modular so that it can be easily tailored to an individual experiment. The items monitored and/or controlled may include gas pressures, temperatures, magnetic fields, high and low voltages, and system status or safety information. (ERA citation 06:005235)

SLAC-PUB-2632 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
MSHAM: A Multi-Hit Sample and Hold Multiplexer.
D. Bernstein. Oct 80, 5p CONF-801103-23
Contract AC03-76SF00515
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

The MSHAM is a single-width CAMAC module intended to be used for dE/dx or Z-position measurements, with a density of 16 analog channels. It is designed to record up to four hits/event per channel but the design can be easily adapted to eight hits. The charge collection time interval allowed per hit is externally controlled in the range of 50 to 500 ns, according to the requirements of the experiment. Besides the electrical performance of the MSHAM, i.e., linearity, noise, cross-talk, etc., the goal was to design mutli-function circuits and high density packaging in order to achieve low cost per channel. (ERA citation 06:006433)

SLAC-PUB-2641 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Low Noise PWC Cathode Readout System.
E. Cisneros, D. Hutchinson, D. McShurley, R. Richter, and S. Shapiro. Oct 80, 6p CONF-801103-30
Contract AC03-76SF00515
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

A system has been developed, primarily to detect the induced charge deposited on PWC cathodes, which is versatile, fast and has a good signal to noise ratio for signals of greater than or equal to 10 exp -14 Coulomb input. The amplifier system, which is completely separated from the detector by 95 omega coaxial cables, is followed by a new charge integrating, version of the SHAM/BADC system developed at SLAC. This SHAM IV system is CAMAC based, allowing for computer calibration of the entire system from amplifier through ADC. (ERA citation 06:006434)

SLAC-PUB-2655 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Brief Review of Recent Results from the Crystal Ball Detector at SPEAR.
E. D. Bloom. Nov 80, 20p
Contract AC03-76SF00515

Performance results are presented for the Crystal Ball detector at SPEAR. Topics covered include: inclusive photon spectra from J/psi and psi' decays; photon cascade decays of the psi'; three-gamma decays of J/psi and psi'; and inclusive eta production. (ERA citation 06:006436)

18E. Nuclear Power Plants

AD-A093 751/6 PC **A02**/MF **A01**
RAND Corp., Santa Monica, CA.
Cost Analysis of Light Water Reactor Power Plants,
William E. Mooz. Sep 80, 9p Rept no. RAND/P-6537

This study centers on a statistical analysis of the licensing time, construction time, and capital cost of light water reactor power plants. The use of these econometric techniques allows the major cost driving variables to be identified through multi-

variate analysis of time series data on over 50 U.S. nuclear power plants. The analysis made in the study provides a clearer picture of the dynamic changes that have occurred in the cost of these power plants than does engineering cost estimates, and produces a tool that can be used to project LWR costs. (Author)

AECL-6329 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Safety of CANDU Nuclear Power Stations.
V. G. Snell. Nov 78, 15p
U.S. Sales Only.

A nuclear plant contains a large amount of radioactive material which could be a potential threat to public health. The plant is therefore designed, built and operated so that the risk to the public is low. Careful design of the normal reactor systems is the first line of defense. These systems are highly resistant to an accident happening in the first place, and can also be effective in stopping it if it does happen. Independent and redundant safety sytems minimize the effects of an accident, or stop it completely. They include shutdown systems, emergency core cooling systems, and containment systems. Massive impairment of any one safety system together with an accident can be tolerated. (Atomindex citation 11:522186)

CEA-CONF-4817 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
Tests and Calculation of the Seismic Behaviour of Concrete Structures.
J. Gauvain, A. Hoffman, C. Jeandidier, and M. Livolant. 1979, 16p CONF-790802-87
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

This paper deals with the frame type buildings, which are generally the most sensible to earthquakes. Its objectives are to describe the main phenomena governing the behaviour of such structures, when the earthquake level increases up to the structure collapse, to point out what type of calculation model shall be used to obtain good results and to give an estimation of the safety factors corresponding to the usual design practice. Extended experimental research on the behaviour of reinforced concrete beams and frames submitted to monotonic or cyclic loading has been done. These tests are very useful to build constitutive laws models, but as they do not reproduce the earthquake loads, they do not simulate directly what happens to the structure during an earthquake. For that reason, since 1966, dynamics tests were performed using vibration generators or shaking-tables. As an example of that type of test and of the corresponding results, we describe here with more details the tests made at the Saclay Center, on a shaking-table called VESUVE, on simple beams and frames. (Atomindex citation 11:525372)

CEA-CONF-4830 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Surete Nucleaire.
Availability of Periodically Tested Systems.
J. P. Signoret. 1979, 8p CONF-7903113-3
Conference on nuclear structure and elementary particle physics, Birmingham, UK, 28 Mar 1979.
U.S. Sales Only.

There is at the present time a need in accurate models to assess the availability of periodically tested stand-by systems. This paper shows how to improve the well known 'saw-tooth curve' model in order to take into account various reliability parameters. A model is developed to assess the pointwise and the mean availabilities of periodically tested stand-by systems. Exact and approximation formulae are given. In addition, the model developed herein leads to optimize the test interval in order to minimize the mean unavailability. A safety diesel in a nuclear power plant is given as an example. (Atomindex citation 11:525856)

CEA-CONF-4835 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Surete Nucleaire.
ESCAF - Failure Simulation and Reliability Calculation Device.
A. Laviron, C. Berard, and R. Quenee. 1979, 10p CONF-7903113-2
Conference on nuclear structure and elementary particle physics, Birmingham, UK, 28 Mar 1979.
U.S. Sales Only.

Reliability studies of nuclear power plant safety functions have, up to now, required the use of large computers. As they are of universal use, these big machines are not very well adapted to deal with reliability problems at low cost. ESCAF has been developed to be substituted for large computers in order to save time and money. ESCAF is a small electronic device which can be used in connection with a minicomputer. It allows to perform complex system reliability analysis (qualitative and quantitative) and to study critical element influences such as common cause failures. In this paper, the device is described and its features and abilities are outlined: easy to implement, swift running, low working cost. Its application range concerns all cases when a good reliability is needed. (Atomindex citation 11:525848)

NUREG/CP-0015 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Reactor Safety Research.
Proceedings of the U.S. Nuclear Regulatory Commission Review Group Conference on Advanced Instrumentation Research for Reactor Safety Held at Oak Ridge National Laboratory on July 29-31, 1980.
Conference proceedings,
A. L. Hon, D. Basdekas, Y. Y. Hsu, N. Kondic, and R. Van Houten. Dec 80, 778p

The report compiles the technical presentations during the Advanced Instrumentation Research for the Reactor Safety Review Group Meeting held in July 1980. The three-day meeting covered the Power Plant Instrumentation, Two-Phase Flow Instrumentation, Fuel Behavior Research Instrumentation and Advanced Reactor Instrumentation research programs sponsored by the U.S. Nuclear Regulatory Commission, Division of Reactor Safety Research. In addition, two invited papers from the nuclear industry were also presented. The conference is held each year to review the up-to-date instrumentation research results by the contractors. It also provides the opportunity for the researchers and experts to exchange experience on advanced instrumentation development. The report serves as a vehicle to disseminate the state-of-the-art information to the research community and the nuclear industry.

NUREG/CR-1833 PC **A09**/MF **A01**
Lawrence Livermore National Lab., CA.
Seismic Review of the Palisades Nuclear Power Plant Unit 1 as Part of the Systematic Evaluation Program.
Technical rept.,
T. A. Nelson, R. C. Murray, D. A. Wesley, and J. D. Stevenson. Jan 81, 187p UCRL-53015

A limited seismic reassessment of Unit 1 of the Palisades Nuclear Power Plant was performed by the Lawrence Livermore National Laboratory for the U. S. Nuclear Regulatory Commission as part of the Systematic Evaluation Program. The reassessment focused generally on reactor coolant pressure boundary and on those systems and components necessary to shut down the reactor safety and to maintain it in a safe shutdown condition following a postulated earthquake characterized by a peak horizontal ground acceleration of 0.2g. Unlike a comprehensive design analysis, the reassessment was limited to structures and components deemed representative of generic classes. Conclusions and recommendations about the ability of selected structures and equipment to withstand the postulated earthquake are presented.

NUREG/CR-1880 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Initial Quantification of Human Errors Associated with Reactor Safety System Components in Licensed Nuclear Power Plants.
Technical rept. 1 Oct 79-30 Sep 80.
Jan 81, 42p BNL-NUREG-51323

The report provides a methodology for an initial quantification of gross categories of human errors made in conjunction with several reactor safety system components operated, maintained and tested in licensed nuclear power plants. The resultant human error rates provide the first real systems bases of comparison for the existing, derived and/or best judgement equivalent set of such rates or probabilities.

NUREG-0422-SUP-4 PC **A10**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of McGuire Nuclear Station, Units 1 and 2, Duke Power Company, Supplement No. 4, Docket Nos. 50-369 and 50-370.
Safety evaluation rept. May 80-Jan 81.
Jan 81, 211p
See also Supplement no. 3, NUREG-0422-SUP-3.

Supplement No. 4 to the Safety Evaluation Report for Duke Power Company's application for licenses to operate the McGuire Nuclear Station (Docket Nos. 50-369 and 50-370), located in Mecklenburg County, North Carolina has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. The purpose of the Supplement is to address the changes to the design bases and analyses for Units 1 and 2 as filed by Duke Power Company's Final Safety Analysis Report Amendments 59 through 65.

NUREG-0697 PC **A21**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Technical Specifications, Joseph M. Farley Nuclear Plant Unit No. 2. Docket No. 50-364. Appendix 'A' to License No. NPF-8.
Oct 80, 496p

The Joseph M. Farley Nuclear Plant, Unit 2, Technical Specifications were prepared by the U.S. Nuclear Regulatory Commission. They set forth the limits, operating conditions and other requirements applicable to a nuclear reactor facility as set forth in Section 50.36 of 10 CFR Part 50 for the protection of the health and safety of the public.

NUREG-0756 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Steam Generator Repair at Turkey Point Plant Units 3 and 4, Docket Nos. 50-250 and 50-251, Florida Power and Light Company.
Safety evaluation rept.
Dec 80, 49p

A Safety Evaluation Report for the Turkey Point Plant, Units 3 and 4, has been prepared by the Office of Nuclear Reactor Regulation. The report considers the safety aspects of the proposed steam generator repair at Turkey Point Plant, Units 3 and 4. The report focuses on the occupational radiation exposure associated with the proposed repair program. It concludes that there is reasonable assurance that the health and safety of the public will not be endangered by the conduct of the proposed action and such activities will be conducted in compliance with the Commission's regulations, and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

NUREG-0759 PC **A23**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Technical Specifications, McGuire Nuclear Station, Unit No. 1, Docket No. 50-369. Appendix 'A' to License No. NPF-9,
M. Virgilio. Jan 81, 546p

The McGuire Nuclear Station Unit 1 Technical Specifications were prepared by the U.S. Nuclear Regulatory Commission to set forth the limits, operating conditions and other requirements applicable to a nuclear reactor facility as set forth in Section 50.36 of 10 CFR Part 50 for the protection of the health and safety of the public.

PB81-156077 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Three Mile Island: The Most Studied Nuclear Accident in History.
Report to the Congress.
9 Sep 80, 86p EMD-80-109

This report discusses the nuclear accident at Three Mile Island, Pennsylvania, the safety problems identified by investigations of the accident, and the actions taken or proposed by the Nuclear Regulatory Commission and others to correct the problems.

PNL-3159 PC **A03**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Nuclear Energy Information Flow from DOE to the Public.
J. L. Simmons, W. L. Rankin, and S. M. Nealey. Jun 80, 43p B-HARC-411/014
Contract AC06-76RL01830

The objective of this research was to study the DOE's program for educating the public about nuclear power and nuclear waste management. DOE's organizational structuree and the procedures used within this structure to disseminate information were studied and readability tests on nuclear information distributed by DOE were conducted. Initial information was obtained through interviews with 29 local, state, and federal DOE representatives. This was supplemented with additional information as it was released by the DOE. The primary goals of the DOE's information program are to encourage two-way communication between the DOE and the public and to encourage public participation in policy-making decisions. Most of this communication, however, is presented orally. Relative to other energy technologies and conservation, very few nuclear brochures are currently being distributed by the DOE. This is especially true with regard to information about nuclear waste. A recent public survey found that a majority of the public wants to learn more about nuclear power and that, with regard to the nuclear fuel cycle, the public wants most to learn about nuclear waste management. Thus, the DOE appears to be missing an eager audience. (ERA citation 06:004927)

PNL-3404 PC **A03**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Attutude-Action Consistency and Social Policy Related to Nuclear Technology.
M. K. Lindell, R. W. Perry, and M. Greene. Jun 80, 27p B-HARC-411/80/030
Contract AC06-76RL01830

This study reports the results of a further analysis of questionnaire data--parts of which have been previously reported by Lindell, Earle, Hebert and Perry (1978)--that are related to the issue of consistency of attitudes and behavior toward nuclear power and nuclear waste management. Three factors are considered that might be expected to have a significant bearing on attitude-action consistency: social support, attitude object importance and past activism. Analysis of the data indicated that pronuclear respondents were more likely to show consistency of attitudes and actions (66%) than were antinuclear respondents (51%) although the difference in proportions is not statistically significant. Further analyses showed a strong positive relation between attitude-action consistency and perceived social support, measured by the degree to which the respondent believed that close friends and work associated agreed with his attitude. This relationship held up even when controls for attitude object importance and past activism were introduced. Attitude object importance--the salience of the issue of energy shortage--had a statistically significant effect only when perceived social support was low. Past activism had no significant relation to attitude-action consistency. These data suggest that the level of active support for or opposition to nuclear technology will be affected by the distribution of favorable and unfavorable attitudes among residents of an area. Situations in which pro- and antinuclear attitudes are concentrated among members of interacting groups, rather than distributed randomly, are more likely to produce high levels of polarization. (ERA citation 06:004958)

18F. Radiation Shielding and Protection

HEDL-SA-2091-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Dynamic Analysis to Establish Normal Shock and Vibration of Radioactive Material Shipping Packages.
S. R. Fields. 1980, 9p CONF-801115-36
Contract AC14-76FF02170
International symposium on packaging and transporting radioactive material, Berlin, F.R. Germany, 10 Nov 1980.

A computer model, CARDS (Cask-Railcar Dynamic Simulator) was developed to provide input data for a broad range of radioactive material packagetiedown structural assessments. CARDS simulates the dynamic behavior of shipping packages and their transporters during normal transport conditions. The model will be used to identify parameters which significantly affect the normal shock and vibration environments which, in turn, provide the basis for determining the forces transmitted to the packages. (ERA citation 06:005808)

JAERI-M-8171 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Code System BCG for gamma-Ray Skyshine Calculation.
H. Ryufuku, T. Numakunai, S. Miyasaka, and K. Minami. Mar 79, 136p
In Japanese.
U.S. Sales Only.

A code system BCG has been developed for calculating conveniently and efficiently gamma-ray skyshine doses using the transport calculation codes ANISN and DOT and the point-kernel calculation codes G-33 and SPAN. To simplify the input forms to the system, the forms for these codes are unified, twelve geometric patterns are introduced to give material regions, and standard data are available as a library. To treat complex arrangements of source and shield, it is further possible to use successively the code such that the results from one code may be used as input data to the same or other code. (Atomindex citation 11:526139)

LA-UR-80-2847 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Investigation of Air Cleaning System Response to Accident Conditions.
R. W. Andrae, J. W. Bolstad, R. D. Foster, W. S. Gregory, and H. L. Horak. 1980, 23p CONF-8010119-1
Contract W-7405-ENG-36
16. DOE nuclear cleaning conference, Boston, MA, USA, Oct 1980.

Air cleaning system response to the stress of accident conditions are being investigated. A program overview and hghlight recent results of our investigation are presented. The program includes both analytical and experimental investigations. Computer codes for predicting effects of tornados, explosions, fires, and material transport are described. The test facilities used to obtain supportive experimental data to define structurai integrity and confinement effectiveness of ventilation system components are described. Examples of experimental results for code verification, blower response to tornado transients, and filter response to tornado and explosion transients are reported. (ERA citation 06:005160)

LA-8546-T PC **A13**/MF **A01**
Los Alamos Scientific Lab., NM.
Minimizing the Cost of Splitting in Monte Carlo Radiation Transport Simulation.
R. J. Juzaitis. Oct 80, 293p
Contract W-7405-ENG-36

A deterministic analysis of the computational cost associated with geometric splitting/Russian roulette in Monte Carlo radiation transport calculations is presented. Appropriate integro-differential equations are developed for the first and second moments of the Monte Carlo tally as well as time per particle history, given that splitting with Russian roulette takes place at one (or several) internal surfaces of the geometry. The equations are solved using a standard S/sub n/ (discrete ordinates) solution technique, allowing for the prediction of computer cost (formulated as the product of sample variance and time per particle history, sigma exp 2 /sub s/tau p) associated with a given set of splitting parameters. Optimum splitting surface locations and splitting ratios are determined. Benefits of such an analysis are particularly noteworthy for transport problems in which splitting is apt to be extensively employed (e.g., deep penetration calculations). (ERA citation 06:006763)

NUREG-0383-V-2-REV-3
PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Fuel Cycle and Material Safety.
Directory of Certificates of Compliance for Radioactive Materials Packages. Volume 2. Certificates of Compliance.
Dec 80, 612p
See also Volume 2, revision 2, NUREG-0383-V-2-REV-2.

The directory contains a Summary Report of NRC approved Packages (Volume 1), Certificates of Compliance (Volume 2), and a Summary Report of NRC Approved Quality Assurance Programs for Radioactive Material Packages (Volume 3). The purpose of the directory is to make available a convenient source of information on packagings which have been approved by the U.S. Nuclear Regulatory Commission. To assist in identifying packaging, an index by Model Number and corresponding Certificate of Compliance number is included at the back of each volume of the directory. The Summary Report includes a listing of all users of each package design prior to the publication date of the directory.

NUREG-0383-V-3 PC **A06**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Fuel Cycle and Material Safety.
Directory of Certificates of Compliance for Radioactive Materials Packages. Volume 3. Summary Report of NRC Approved Quality Assurance Programs for Radioactive Material Packages.
Dec 80, 120p

The directory contains a Summary Report of NRC approved Packages (Volume 1), Certificates of Compliance (Volume 2), and a Summary Report of NRC Approved Quality Assurance Programs for Radioactive Material Packages (Volume 3). The purpose of this directory is to make available a convenient source of information on packagings which have been approved by the U.S. Nuclear Regulatory Commission. To assist in identifying packaging, an index by Model Number and corresponding Certificate of Compliance number is included at the back of each volume of the directory. The Summary Report includes a listing of all users of each package design prior to the publication date of the directory.

PATENT-4 190 160
Not available NTIS
Department of Energy, Washington, DC.
Accident Resistant Transport Container.
Patent,
J. A. Andersen, and J. K. Cole. Filed 6 Mar 79, patented 26 Feb 80, 6p PAT-APPL-6-018 098
Supersedes PAT-APPL-6-018 098.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention relates to a container for the safe air transport of plutonium having several intermediate wood layers and a load spreader intermediate an inner container and an outer shell for mitigation of shock during a hypothetical accident. (ERA citation 06:006369)

RHO-C-48 PC **A19**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Experimental Demonstration Package Program. Canister Final Design Report.
D. H. Kurasch, D. F. Moran, and J. B. Wright. Aug 80, 442p AESD-TME-3047, WAES-TME-2999
Contract AC06-77RL01030

The Experimental Demonstration Package Program objective was to design and qualify a canister for encapsulating spent lightwater reactor fuel assemblies and the support equipment necessary for sealing the canister. These items will be used in preparing fuel assemblies for demonstrations associated with the Nuclear Waste Terminal Storage Program. This report describes the program requirements, the final design of the canister, alternate designs considered during the program, the support equipment, and the testing and analysis performed to verify the design. Support equipment discussed here includes a remote plasma arc welding system and an evacuation/backfill collar. The testing and analysis effort consisted of a canister drop test, a seismic test, a welding process development program, a shipping cask/canister thermal interference study, and thermal and structural evaluations of the canister under potential storage and handling conditions. (ERA citation 06:005809)

18G. Radioactive Wastes and Fission Products

AERE-R-9610 PC **A03**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Theoretical Physics Div.
NAMMU: Finite Element Program for Coupled Heat and Groundwater Flow Problems.
J. Rae, and P. C. Robinson. Nov 79, 38p
U.S. Sales Only.

NAMMU is a computer program which will calculate the evolution in time of coupled water and heat flow in a porous medium. It is intended to be used primarily for modelling studies of underground nuclear waste repositories. NAMMU is based on the Galerkin-Finite-element method and has self-adjusting time stepping. The present version is written for 2-dimensional cartesian or cylindrical coordinate systems. It has been checked against two calculations from the KBS study and an exact solution by Hodgkinson for a very idealised repository design. (Atomindex citation 11:526079)

ANL-79-109 PC **A04**/MF **A01**
Argonne National Lab., IL.
Chemical Engineering Division Fuel Cycle Programs. Quarterly Progress Report, July-September 1979.
M. J. Steindler, R. A. Couture, K. F. Flynn, L. J. Jardine, and W. J. Mecham. Sep 80, 60p
Contract W-31-109-ENG-38

In a project to identify the advantages and disadvantages of encapsulating solidified waste forms in a metal matrix, leach rates of hazardous radionuclides from various matrix mterials as a function of temperature are being studied. Also, a methodology for analyzing particle size distributions obtained in impact-testing of brittle waste-form materials has been applied to the impact testing of Pyrex spheres and to earlier impact tests of a variety of materials. The transport properties of nuclear waste in geologic media are being studied. Porosity of basalt columns was measured by a method based on the elution of tritiated water. Batch tests were performed to determine the effect of rubidium concentration on cesium adsorption by limestone. An apparatus for infiltrating intact rocks with high-pressure groundwater solutions was constructed. In work on trace-element transport in lithic material, the sorption by Fe sub 2 O sub 3 of iodate in concentrations of 10 exp -2 to 10 exp -13 M and from pH 3 to 8.7 was measured, as was the sorption of iodate by sea sediments. (ERA citation 06:005813)

CONF-801124-20(Dr) PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Characterization of Nuclear Waste Forms by EPR Spectroscopy.
L. A. Boatner, M. M. Abraham, and M. Rappaz. Oct 80, 9p
Contract W-7405-ENG-26
Annual meeting of the Materials Research Society, Boston, MA, USA, 17 Nov 1980.

Single crystals of LaPO sub 4 have been grown with the addition of various amounts of PW-4b simulated waste, and the EPR spectra of Gd exp 3+ in these samples have been compared with that obtained for a pure LaPO sub 4 single crystal. The relationship between the average linewidth of two symmetric EPR transitions and their magnetic field separation for pure and PW-4b doped LaPO sub 4 crystals are shown quantitatively. These measurements were carried out for four different crystals and two different magnetic field orientations. Since the linewidth of each transition is proportional to its magnetic field separation from the central line, it can be concluded that the line broadening is inhomogeneous (i.e., the line broadening is due to a distribution of line positions with this distribution resulting from a distribution of impurities in the crystal). The sensitivity of Gd exp 3+ linewidths to defects or strains is also under investigation as a means of detecting metamictization phenomena in orthophosphates. Mixed Ln/sub 1-x/An/sub x/PO sub 4 crystals, where Ln is a rare earth and An an actinide, have been grown and EPR spectra of Gd exp 3+ in these systems are of considerable interest for detecting radiation damage created by alpha -particles or recoil of the daughter nuclei. Although the examples of the application of EPR to waste form characterization described here have emphasized studies of lanthanide orthophosphates, the same techniques can be applied to perovskite, hollandite, zirconolite, etc. single crystals or powders or to amorphous materials. (ERA citation 06:005815)

CONF-801124-36 PC **A02**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Loading and Leakage of Krypton Immobilized in Zeolites and Glass.
A. B. Christensen, J. A. Del Debbio, D. A. Knecht, and J. E. Tanner. 1980, 8p
Contract AC07-79ID01675
Annual meeting of the Materials Research Society, Boston, MA, USA, 17 Nov 1980.

Krypton-85 is formed in nuclear power reactors and remains trapped until the fuel is reprocessed. Federal regulations limit the release of exp 85 Kr to the environment, requiring recovery and storage of 85% of the exp 85 Kr produced in commercial light-water reactors after January 1, 1983. One of the long-term storage options involves encapsulating exp 85 Kr in zeolites or glasses at high pressure and temperature. This paper presents experimental results for krypton encapsulation and leakage in sodalite, zeolite 5A, and Vycor Thristy glass. The results show that all three materials are feasible for exp 85 Kr immobilization and long-term storage, although zeolite 5A and Thirsty Vycor are preferable due to lower leakage rates. (ERA citation 06:004568)

DOE/AL/10752-7 PC **A08**/MF **A01**
New Mexico Environmental Improvement Agency, Sante Fe.
WIPP Site and Vicinity Geological Field Trip.
L. Chaturvedi. Oct 80, 162p
Contract AC04-78AL10752

The Environmental Evaluation Group is conducting an assessment of the radiological health risks to people from the Waste Isolation Pilot Plant. As a part of this work, EEG is making an effort to improve the understanding of those geological issues concerning the WIPP site which may affect the radiological consequences of the proposed repository. One of the important geological issues to be resolved is the timing and the nature of the dissolution processes which may have affected the WIPP site. EEG organized a two-day conference of geological scientists, on January 17-18, 1980. On the basis of the January conference and the June field trip, EEG has formed the following conclusions: (1) it has not been clearly established that the site or the surrounding area has been attacked by deep dissolution to render it unsuitable for the nuclear waste pilot repository; (2) the existence of an isolated breccia pipe at the site unaccompanied by a deep dissolution wedge, is a very remote possibility; (3) more specific information about the origin and the nature of the brine reservoirs is needed. An important question that should be resolved is whether each encounter with artesian brine represents a separate pocket or whether these occurrences are interconnected; (4) Anderson has postulated a major tectonic fault or a fracture system at the Basin margin along the San Simon Swale; (5) the area in the northern part of the WIPP site, identified from geophysical and bore hole data as the disturbed zone, should be further investigated to cleary understand the nature and significance of this structural anomaly; and (6) a major drawback encountered during the discussions of geological issues related to the WIPP site is the absence of published material that brings together all the known information related to a particular issue. (ERA citation 06:005816)

DOE/ID/05170-T1 PC **A05**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Managing Low-Level Radioactive Wastes: A Proposed Approach.
Aug 80, 96p
Contract AC07-76ID01570

This document is a consensus report of the Low-Level Waste Strategy Task Force. It covers system-wide issues; generation, treatment, and packaging; transportation; and disposal. Recommendations are made. (ERA citation 06:004569)

DOE/ID/12115-T1 PC **A99**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
ICPP Injection Well Alternative Project, Idaho National Engineering Laboratory. Final Report.
Oct 80, 607p
Contract AC07-80ID12115

The Idaho Chemical Processing Plant (ICPP) portion of the Idaho National Engineering Laboratory (INEL) has been obtaining water needed for its operations from the Snake River aquifer, which occupies the entire region underlying the site. Most of this water has been used for cooling operating equipment, while a small portion has found various process uses. After passing through the ICPP process area, these waters are then returned to the aquifer. A small portion (about 1%) of the returned stream contains measurable amounts of radioactivity derived from the miscellaneous process users. This report and the recommendations contained herein are based upon stream flows projected for 1985 as supplied by DOE for the ICPP. 26 different alternatives for handling cooling water, chemical, and low level radioactive water disposal are examined. These cases are considered from technical, environmental, safety, and economic points of view. The level of detail is sufficient to eliminate non-viable cases, and to identify those which offer improvements over present practice. The Environmental/Safety Risk Factors were evaluated on a qualitative comparison basis only. Before a recommended improvement is incorporated into the waste disposal system, a conceptual design study should be made which would evaluate all those secondary effects and environmental factors that, by the very nature of the screening process, this study has not provided. Certain synergistic combinations have been noted and are discussed. This report does note whether the operations considered are in regulatory compliance, or are likely to be capable of providing lasting improvement to the waste water system. Qualitative comparisons were made between the various alternatives to confirm their relationship with applicable standards. (ERA citation 06:004570)

DP-MS-80-112 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Computer Modeling of Ground-Water Flow at the Savannah River Plant.
R. W. Root, Jr. 1980, 14p CONF-801145-3
Contract AC09-76SR00001
Geological Society of America meeting, Atlanta, GA, USA, 17 Nov 1980.

A predictive model for the space-time distributions of hydraulic head and ground-water flow velocity has been developed for the vicinity of the low-level radioactive waste burial grounds at the Savannah River Plant. The hydraulic head distribution is being modeled using a computer code that solves the ground-water flow equation using a three-dimensional finite-difference scheme. Steady-state calibration of this model is complete, and transient calibration is under way. (ERA citation 06:004573)

DP-MS-80-96 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.

Leach Rate Studies on Glass Containing Actual Radioactive Waste.
D. D. Walker, J. R. Wiley, M. D. Dukes, and J. H. LeRoy. 1980, 14p CONF-801206-3
Contract AC09-76SR00001
ORNL: conference on the leachability of radioactive solids, Gatinburg, TN, USA, 9 Dec 1980.

Borosilicate glass containing radioactive wastes from the Savannah River Plant have been leached for 900 days. The International Standards Organization's (ISO) static leach test procedure was used on glass buttons in various leachants. Leach rates based on exp 90 Sr and exp 137 Cs analyses were similar: 2 x 10 exp -8 to 3 x 10 exp -8 g/(cm exp 2)(d) in distilled water, 1 x 10 exp -8 to 3 x 10 exp -7 g/(cm exp 2)(d) in pH 7 buffer, 3 x 10 exp -7 to 7 x 10 exp -7 g/(cm exp 2)(d) in pH 9 buffer, and 7 x 10 exp -6 to 8 x 10 exp -5 g/(cm exp 2)(d) in pH 4 buffer. Rates based on Pu analyses were the same as above in distilled water and pH 9 buffer, but were lower by an order of magnitude in pH 4 and pH 7 buffers. Almost all leach rates remained constant between 200 and 900 days of leaching. Increasing the concentration of the buffering agents had no effect on the leach rates at pH 7 (phosphate) and pH 9 (carbonate), but dramatically increased the rates at pH 4 (acetate). Leach rates did not differ significantly between high aluminum and high iron waste glasses. (ERA citation 06:004572)

EGG-2055 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
TWTF Project Criticality Task Force Final Review and Assessment.
K. B. McKinley, J. W. Cannon, F. J. Wheeler, and H. A. Worle. Nov 80, 45p
Contract AC07-76ID01570

The Transuranic Waste Treatment Facility (TWTF) is being developed to process transuranic waste, stored and buried at the Idaho National Engineering Laboratory, into a chemically inert, physically stable basalt-like residue acceptable at a federal repository. A task force was assembled by the TWTF Project Division to review and assess all aspects of criticality safety for the TWTF. This document presents the final review, assessments, and recommendations of this task force. The following conclusions were made: Additional criticality studies are needed for the entire envelope of feed compositions and temperature effects. Safe operating k/sub eff/'s need to be determined for process components. Criticality analyses validation experiments may also be required. SRP neutron interrogation should be replaced by DDT neutron interrogation. Accuracy studies need to be performed for the proposed assaying techniques. Time-correlated neutron monitoring needs to be mocked up for process components to prove feasibility and determine accuracy. The criticality control techniques developed for the TWTF conceptual design are in compliance with ERDAM 0530, including the Double Contingency Rule. Detailed procedures and controls need to be developed. (ERA citation 06:004574)

ENICO-1042 PC **A07**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Calcination of Dilute Zirconium Waste.
B. J. Newby. Nov 80, 128p
Contract AC07-79ID01675

A method was developed for converting dilute zirconium wastes stored at the Idaho Chemical Processing Plant (ICPP) into granular, free-flowing solids using fluidized-bed calcination. Prior to calcination, the dilute zirconium wastes are blended with sodium-bearing waste so that the calcine produced contains as much as 5.3 mole % sodium; calcium nitrate is added to the blend to give a calcium-to-fluoride mole ratio of 0.7. (ERA citation 06:004575)

INIS-mf-5870 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). Div. of Nuclear Power and Reactors.
Circular of 16 June 1976 on Transport of Radioactive Material.
16 Jun 76, 22p
In Danish.
U.S. Sales Only.

This Circular of the State Institute of Radiation Hygiene, made under the Order of 20 November 1975 on the Safe Use of Radioactive Substances, specifies the licensing requirements for the transport of radioactive materials. Licences for such transport must be obtained from the National Health Service, in practice the Institute, which is the competent authority for matters involving radioactive materials. (Atomindex citation 11:542072)

JAERI-M-8332 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Data Sheets of Fission Product Release Experiments for Light Water Reactor Fuel, (2).
N. Ishiwatari, H. Nagai, T. Takeda, K. Yamamoto, and C. Nakazaki. Jul 79, 110p
In Japanese.
U.S. Sales Only.

This is the second data sheets of fission products (FP) release experiments for light water reactor fuel. Results of five FP release experiments from the third to the seventh are presented: results of pre-examinations of UO sub 2 pellets, photographs of parts of fuel rod assemblies for irradiation and the assemblies, operational conditions of JMTR and OWL-1, variations of radioiodine-131 level in the main loop coolant during experimental periods, and representative results of post-irradiation examinations of respective fuel rods. (Atomindex citation 11:525881)

LA-UR-80-3366 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Overview of Resuspension Model: Application to Low Level Waste Management.
J. W. Healy. 1980, 12p CONF-801217-1
Contract W-7405-ENG-36
Symposium on modeling and low-level waste management, Denver, CO, USA, 1 Dec 1980.

Resuspension is one of the potential pathways to man for radioactive or chemical contaminants that are in the biosphere. In waste management, spills or other surface contamination can serve as a source for resuspension during the operational phase. After the low-level waste disposal area is closed, radioactive materials can be brought to the surface by animals or insects or, in the long term, the surface can be removed by erosion. Any of these methods expose the material to resuspension in the atmosphere. Intrusion into the waste mass can produce resuspension of potential hazard to the intruder. Removal of items from the waste mass by scavengers or archeologists can result in potential resuspension exposure to others handling or working with the object. The ways in which resuspension can occur are wind resuspension, mechanical resuspension and local resuspension. While methods of predicting exposure are not accurate, they include the use of the resuspension factor, the resuspension rate and mass loading of the air. (ERA citation 06:004595)

LBL-11651 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Radioactive Waste Storage in Mined Caverns in Crystalline Rock: Results of Field Investigations at Stripa, Sweden.
P. A. Witherspoon. Oct 80, 67p CONF-8010132-1
Contract W-7405-ENG-48
75th anniversary of the Illinois State Geological Survey symposium, Urbana, IL, USA, 9 Oct 1980.

It is generally agreed that the most practicable method of isolating nuclear wastes from the biosphere is by deep burial in suitable geologic formations. Such burial achieves a high degree of physical isolation but raises questions concerning the rate at which some of these wastes may return to the biosphere through transport by groundwater. Any suitable repository site will be disturbed first by excavation and second by the thermal pulse caused by the radioactive decay of the wastes. To assess the effectiveness of geologic isolation it is necessary to develop the capability of predicting the response of a rock mass to such a thermal pulse. Ultimately, this requires field measurements below the surface in media representative of those likely to be encountered at an actual repository. Access to a granitic rock mass adjacent to a defunct iron ore mine at Stripa, Sweden, at a depth of about 350 m below surface has provided a unique opportunity to conduct a comprehensive suite of hydrological and thermo-mechanical experiments under such conditions. The results of these field tests have shown the importance of geologic structure and the functional dependence of the thermo-mechanical properties on temperature in developing a valid predictive model. The results have also demonstrated the vital importance of carrying out large-scale investigations in a field test facility. (ERA citation 06:004578)

MLM-2784 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
Tritium Waste Control: April-September 1980.
P. H. Lamberger, and M. L. Rogers. 26 Nov 80, 30p
Contract AC04-76DP00053

The Combined Electrolysis Catalytic Exchange (CECE) pilot system was operated using Maxey Flats trench water as feed. Two pneumatic seal electrolysis cells were procured. One will be used as a control (operated with nontritiated water) for the high-level tritiated water electrolysis tests. A test system for the cells was designed, built and successfully tested. Several additional impurity analyses were completed on effluent recovery system (ERS) water. Bench-scale experiments were conducted to define methods and parameters for removal of oil-organics from ERS water. Four types of activated carbon were used to absorb vacuum pump oil from 1 to 10% mixtures in water. Two experiments were conducted to determine the efficiency of the catalytic reactor to oxidize elemental tritium and also to determine the efficiency of the adsorption columns to capture the oxidized tritium. The resulting data indicate that reactor efficiency is >90% for concentrations on the order of 10 mCi/m exp 3 , and about 50% at 0.5 mCi/m exp 3 . The adsorption columns were also found to have less than the assumed 100% efficiency at capturing the HTO. Concentration data indicate possible channeling instead of breakthrough. The study of tritium release from representative burial packages continued. The two waste-water drums which have the highest tritium release (29 mCi and 85 mCi) also contain the highest amounts of tritium, originally 34,480 Ci and 52,128 Ci, respectively. The tritium release from the polymer-impregnated, tritiated concrete and the control remain too low to be illustrated on the current figures. (ERA citation 06:004579)

MLM-2786 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Pelletized Waste Form Demonstration Program, April-September 1980.
E. L. Lewis, and R. F. Herbert, Jr. 24 Nov 80, 14p
Contract AC04-76DP00053

During this six-month reporting period, performance testing of waste/cement pellets was continued. These evaluations included radiolysis, leachability, and compressive strength. As a part of the Waste Certification Program, alpha radiolysis testing of strippable paint and polyurethane foam was also performed. No measurable amounts of gas were generated by alpha-radiolytic attack of the WD sludge/cement matrix. Gases were, however, generated in the paint and foam experiments. The installation and cold demonstration of the Production Waste Pelletization Line were accomplished. Several 1-in.-dia pellets with L/D ratios of 0.5 to 0.7 were manufactured using a semiautomatic press and die set. Hot pellets will be produced as scheduled during the month of October 1980. (ERA citation 06:004580)

NUREG/CR-0912-V-1 PC **A15**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Geoscience Data Base Handbook for Modeling a Nuclear Waste Repository. Volume 1.
Final rept. Aug 78-Dec 79,
Dana Isherwood. Jan 81, 338p UCRL-52719-VOL-1
See also Volume 2, NUREG/CR-0912-V-2.

This handbook contains reference information on parameters that should be considered in analyzing or modeling a proposed nuclear waste repository site for high-level, transuranic and spent-fuel waste. Volume 1 contains a data base on salt as a repository medium. Chapters on the geology of bedded and dome salt, the geomechanics of salt, hydrology, geochemistry, natural and man-made features, and seismology provide compiled data

and related information useful for studying a proposed repository in salt.

NUREG/CR-1223 PC **A15**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Dry Storage of Spent Nuclear Fuel: A Preliminary Survey of Existing Technology and Experience.
Technical rept. Jan-Dec 79,
Philip A. Anderson, and Howard S. Meyer. Apr 80, 328p

A survey was made of the operating and experimental dry storage facilities for irradiated nuclear fuels at the Idaho National Engineering Laboratory, Hanford Reservation, and Nevada Test Site in the United States, at the Whiteshell Nuclear Research Establishment in Canada, and at the Wylfa Power Station in England. The design, safety features, and operational experiences for existing canyon-, caisson-, and sealed storage cask-mode storage facilities are given.

NUREG/CR-1395 PC **A11**/MF **A01**
National Oceanic and Atmospheric Administration, Idaho Falls, ID. Air Resources Lab.
EOCR Building Wake Effects on Atmospheric Diffusion.
Technical memo.,
G. E. Start, N. F. Hukari, J. F. Sagendorf, J. H. Cate, and C. R. Dickson. Jan 81, 227p NOAA-TM-ERL-ARL-91

A series of 22 simultaneous releases of three gaseous tracers was conducted around the EOCR test reactor building at the Idaho National Engineering Laboratory in SE Idaho. Hourly average gaseous tracer concentrations were sampled on several concentric sampling arcs and at a limited number of elevated locations. Winds and temperatures were measured on a nearby 30mm tower. Complete data appendices provide tracer concentration measurements, temperatures, winds and detailed wind statistics, derived diffusion statistics, and plots and analyses.

ONWI-115 PC **A05**/MF **A01**
RE/SPEC, Inc., Rapid City, SD.
Parametric Study Involving Thermo/Viscoelastic Analyses of a Room and Pillar Configuration.
R. A. Wagner. Jul 80, 96p
Contract AC06-76RL01830

Thermo/viscoelastic analyses were performed to determine the sensitivity of three parameters important in the design of radioactive waste repositories. These three parameters were repository depth, ratio of pillar height to pillar width (extraction ratio), and thermal loading. The relative importance of each parameter was determined by comparison of both the thermal and mechanical results with the magnitude of room closure being the major comparative item. A single room-and-pillar configuration was investigated in this near field study using the finite element method. The constitutive law describing the viscous behavior of the host rock (bedded salt) was derived from laboratory testing of specimens from Lyons, Kansas. The most influential of the three parameters, based on the parameter ranges considered, was repository depth. The influence of ventilation greatly reduces the temperature distribution near the room periphery. An optimum ratio of pillar height to pillar width exists for every combination of thermal loading and repository depth. (ERA citation 06:004581)

PB81-147431 PC **A02**/MF **A01**
Bureau of Mines, Salt Lake City, UT. Salt Lake City Research Center.
Absorption of Radium and Thorium from New Mexico Uranium Mill Tailing Solutions.
Rept. of investigations/1980,
H. R. Beard, H. B. Salisbury, and M. B. Shirts. 1980, 19p BUMINES-RI-8463

The Bureau of Mines investigated the absorption of radium and thorium from waste uranium leach liquor by clays and other materials. This work was conducted in support of the Bureau's goal of minimizing the environmental conflicts, impacts, and occupational hazards associated with mining and milling operations. Tailing and soil samples from New Mexico were evaluated for their potential to absorb radium and thorium from tailing liquors. Absorption ranged from 0 to 97 pct for radium and 0 to 60 pct for thorium. Some samples that readily absorbed radium were contacted with various salt solutions that could be present in tailing solutions to determine whether desorption would be a potential problem. The desorption of radium ranged from 0 to 75 pct. An alpha spectrometric method was used to determine the radium and thorium concentrations in the solutions and solids.

PB81-156564 PC **A05**/MF **A01**
Office of Radiation Programs, Washington, DC.
Economic Impacts of 40 CFR 191: Environmental Standards and Federal Radiation Protection Guidance for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes,
Andrew J. Leiter. Dec 80, 94p EPA-520/4-80-014

This report estimates the potential economic impacts of EPA's proposed standards and guidance for the management and disposal of spent fuel, high-level, and transuranic radioactive wastes. The economic analysis assumes that the standards and guidance will have an incremental effect on the reference waste management programs that are assumed to take place in the future. Both commercial and defense waste management programs are covered. For the commercial sector, the impact of the standards on electricity rates is investigated.

PNL-SA-8358 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Recovery and Use of Fission Product Noble Metals.
G. A. Jensen, C. A. Rohmann, and L. D. Perrigo. Jun 80, 23p CONF-800607-91
Contract AC06-76RL01830
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Noble metals in fission products are of strategic value. Market prices for noble metals are rising more rapidly than recovery costs. A promising concept has been developed for recovery of noble metals from fission product waste. Although the assessment was made only for the three noble metal fission products (Rh, Pd, Ru), there are other fission products and actinides which have potential value. (ERA citation 06:004584)

PNL-3372 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Immobilization of High-Level Defense Waste in a Slurry-Fed Electric Glass Melter.
R. A. Brouns, G. B. Mellinger, T. A. Nelson, and K. H. Oma. Nov 80, 109p
Contract AC06-76RL01830

Scoping studies have been performed at the Pacific Northwest Laboratory related to the direct liquid-feeding of a generic high-level defense waste to a joule-heated ceramic melter. Tests beginning on the laboratory scale and progressing to full-scale operation are reported. Laboratory work identified the need for a reducing agent in the feed to help control the foaming tendencies of the waste glass. These tests also indicated that suspension agents were helpful in reducing the tendency of solids to settle out of the liquid feed. Testing was then moved to a larger pilot-scale melter (designed for approx. 2.5 kg/h) where verification of the flowsheet examined in the lab was accomplished. It was found that the reducing agent controlled foaming and did not result in the precipitation of metals. Pumping problems were encountered when slurries with higher than normal solids content were fed. A demonstration (designed for approx. 50 kg/h) in a full-scale melter was then made with the tested flowsheet; however, the amount of reducing agent had to be increased. In addition, it was found that feed control needed further development; however, steady-state operation was achieved giving encouraging results on process capacities. During steady-state operation, ruthenium losses to the offgas system averaged less than 0.16%, while cesium losses were somewhat higher, ranging from 0.91 to 24% and averaging 13%. Particulate decontamination factors from feed to offgas in the melter ranged from 5 x 10 exp 2 to greater than 10 exp 3 without any filtration or treatment. Approximately 1050 kg of glass was produced from 2900 L of waste at rates up to 40 kg/h. (ERA citation 06:004582)

RHO-BWI-C-58 PC **A10**/MF **A01**
Dames and Moore, Burlington, MA.
Numerical Modeling of Rock Stresses within a Basaltic Nuclear Waste Repository. Annual Report for Fiscal Year 1979.
G. Hocking, and C. M. St. John. 30 Sep 79, 209p
Contract AC06-77RL01030

The work entailed thermomechanical and fluid-flow modeling in both the development of such models and in their application to a preconceptual repository design and the Near-Surface Test Facility. The present numerical models available at University of Minnesota and Dames and Moore are summarized. Areas in which further code development are required have been identified as discontinuum models, the discrete element method, and fluid-flow models. The applicability of the various numerical models are also described and their areas of application delineated. Analyses of the preconceptual repository layout and the Near-Surface Test Facility test program are presented. (ERA citation 06:005820)

RHO-CD-772 PC **A03**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Commercial Waste and Spent Fuel Packaging Program. Package Design Criteria.
Aug 79, 44p
Contract AC06-77RL01030

A preliminary set of package design guidelines is presented which should represent a useful starting point for establishing a system mutually acceptable to all people in the waste management system. Among the design parameters covered are package weight, dimensions, overpack, design life, internal pressure, design basis accident, leach rate, criticality, heat flux, surface dose rate, decontamination, licensability, and labeling. (ERA citation 06:005823)

RHO-LD-123 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Granulometric Analysis of Sediments Containing Transuranic Radionuclides.
R. M. Smith, and M. K. Additon. Nov 80, 20p
Contract AC06-77RL01030

A dry sieving technique using a sonic sifter was selected for the granulometric analysis of sediment samples containing radionuclide contamination. A sieve facility was established in the 234-5Z building for this purpose. Fifty-two contaminated sediment samples from the 216-Z-1A crib were sieved in the facility at a rate of two to four samples per day with no major problems. A comparison of particle size and radionuclide concentration indicated that there is no obvious benefit to particle size separation as a means of sediment decontamination, though an economic analysis will have to be conducted before a final decision can be made. (ERA citation 06:005825)

RHO-LD-80-101-D PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Long-Term High-Level Defense Waste Technology. Progress Report, July-September 1980.
Nov 80, 36p
Contract AC06-77RL01030

Progress this period included studies of environmental aspects, retrieval of waste from underground tanks, ozonation of liquid waste, processing of Hanford HLW for fixation, Sr sorption by titanate, equipment development, etc. (ERA citation 06:005824)

RHO-ST-32 PC **A15**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Preliminary Evaluation of Alternative Forms for Immobilization of Hanford High-Level Defense Wastes.
W. W. Schulz, M. M. Beary, S. A. Gallagher, B. A. Higley, and R. G. Johnston. Sep 80, 345p
Contract AC06-77RL01030

A preliminary evaluation of solid waste forms for immobilization of Hanford high-level radioactive defense wastes is presented. Nineteen different

waste forms were evaluated and compared to determine their applicability and suitability for immobilization of Hanford salt cake, sludge, and residual liquid. This assessment was structured to address waste forms/processes for several different leave-retrieve long-term Hanford waste management alternatives which give rise to four different generic fractions: (1) sludge plus long-lived radionuclide concentrate from salt cake and residual liquid; (2) blended wastes (salt cake plus sludge plus residual liquid); (3) residual liquid; and (4) radionuclide concentrate from residual liquid. Waste forms were evaluated and ranked on the basis of weighted ratings of seven waste form and seven process characteristics. Borosilicate Glass waste forms, as marbles or monoliths, rank among the first three choices for fixation of all Hanford high-level wastes (HLW). Supergrout Concrete (akin to Oak Ridge National Laboratory Hydrofracture Process concrete) and Bitumen, low-temperature waste forms, rate high for bulk disposal immobilization of high-sodium blended wastes and residual liquid. Certain multi-barrier (e.g., Coated Ceramic) and ceramic (SYNROC Ceramic, Tailored Ceramics, and Supercalcine Ceramic) waste forms, along with Borosilicate Glass, are rated as the most satisfactory forms in which to incorporate sludges and associated radionuclide concentrates. The Sol-Gel process appears superior to other processes for manufacture of a generic ceramic waste form for fixation of Hanford sludge. Appropriate recommendations for further research and development work on top ranking waste forms are made. (ERA citation 06:004590)

SAND-80-0304 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Subseabed Radioactive Waste Disposal Feasibility Program: Ocean Engineering Challenges for the 80'S.
D. M. Talbert. Nov 80, 23p
Contract AC04-76DP00789

The objective of the Subseabed Disposal Program is to assess the feasibility of disposing of high-level radioactive wastes or spent fuel in suitable geologic formations beneath the deep ocean floor. The program is entering a phase which will address engineering feasibility. While the current phase of the program to determine the scientific and environmental feasibility of the concept is not yet complete, activities to assess the engineering aspects are being initiated in parallel to facilitate the development of the concept on a time scale commensurate with related programs both in the United States and abroad. It is anticipated that engineering aspects will become the central focus of the program during the early 80's and will continue so through the establishment of a pilot-plant level activity which could occur by the mid-90's. (ERA citation 06:004591)

STUDSVIK/K4-79-19 PC **A02**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fuel Model Studies. Calculation of Fuel Rod Fission Product Inventories Using GAPCON-THERMAL-2.
K. Malen, and K. Kilter. Apr 79, 22p
U.S. Sales Only.

The part of the fuel behaviour code GAPCON-THERMAL-2, which calculates fission product inventories in the krypton and xenon chains, has been up-dated and corrected and now yields the same values as the fission product inventory code BEGAFIP with a standard deviation of 5 percent. In order to obtain a correct thermal flux and thus correct flux dependent fission product inventories cross sections might need special preparation, in particular the capture cross section of U-238, since the calculation method in GAPCON only considers thermal flux. (Atomindex citation 11:525862)

STUDSVIK/K4-79-48 PC **A04**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fission Product Migration in Intact Fuel Rods S176 Experiments 8 and 9.
W. Blackadder, R. Forsyth, M. Hillver, L. Jansson, and J. Kilter. Aug 79, 66p
U.S. Sales Only.

This report describes the results for rods 8 and 9 in the S176 series of experiments in the Swedish Aagesta R3 and Studsvik R2 reactors. The aim of this series is to provide information on the distribution of fission products in intact irradiated fuel rods, both within the UO sub 2 fuel and on the inside of the Zircaloy clad. Results reported here are from axial gamma scanning, radial gamma scanning, ceramography and fission gas release measurements. (Atomindex citation 11:525860)

STUDSVIK/K4-79-54 PC **A02**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fission Product Migration in Intact Fuel Rods. S176 Experiment 7. Ceramography from the Fuel-to-Clad GAP.
W. Blackadder, R. S. Forsyth, K. Malen, and C. Wikstroem. Aug 79, 17p
U.S. Sales Only.

The aim of the S176 series of irradiation experiments in the Swedish R2 and R3 reactors is to obtain basic data on the migration of fission products in intact irradiated UO sub 2 fuel rods. In this paper the results from the ceramography of the fuel-to-clad gap in rod S176-7 are reported. The fuel rod S176-7 har been irradiated at a relatively high power (max 51 kW/m) to a relatively high burn-up (25 MWd/kg U). What is seen in the fuel-to-clad gap is typical of this type of power history. On the clad inside surface is found an about 5 mu m thick layer presumably 'zirconium oxide'. In many cases fuel fragments are bonded to the clad through this layer. In front of cracks in the fuel is often found grey 'cesiumuranate'. When the amount is large, regions of different grey tones can be seen. 'Cesiumuranate' is also formed in cracks near the fuel surface. In the central part of the fuel grain growth and also grain boundary and grain edge porosity are observed. Due to the high power and high burnup white inclusions, probably metallic i.e. Mo, Tc, Ru, Rh and Pd are found on the grain boundaries. An interesting feature is the occurrence of small bubbles. These seem to lie on the original grain boundaries. At the periphery of the fuel and in particular around cracks from the fuel surface regions of grain loss are observed. This is probably related to the high burn-up (25 MWd/kg U) and low temperature and the embrittlement due to grain boundary fission gas. (Atomindex citation 11:525859)

18H. Radioactivity

AD-A093 743/3 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
Cooperative Radiation Effects Simulation Program.
Annual progress rept. 1 Sep 78-31 Aug 79,
L. A. Beach, and F. A. Smidt, Jr. 16 Dec 80, 63p
Rept no. NRL-MR-4379

The Cooperative Radiation Effects Simulation Program (CORES) is a collaborative effort of the Material Science and Technology and the Radiation Technology Divisions of the NRL Material Science and Component Technology Area. The goal of the research is to provide the theoretical and experimental bases for understanding the mechanisms of nuclear radiation damage of metals, as well as a theoretical insight into energy deposition processes. In this, the Van de Graaff and Cyclotron are used to simulate rapidly the radiation damage produced over long periods in reactor neutron environments. Progress for the period, 1 September 1978 to 31 August 1979, includes: (1) the effect of Ni+ ion bombardment on nickel and binary nickel alloys was investigated at 675 C, 625 C and 525 C and compared with neutron irradiation at 455 C; (2) the microstructures of titanium scoping alloys following low fluence neutron at 450 C were studied by transmission electron microscopy; and (3) X-ray diffraction measurements of early stages of radiation damage in metals was studied in single crystal and polycrystalline Cu specimens. (Author)

AD-338 337/9 PC **A03**/MF **A01**
Defense Atomic Support Agency, Washington, DC.
Physical Factors and Dosimetry in the Marshall Island Radiation Exposures
C.A. Sondhaus, and V.P. Bond. Dec 55, 46p
DASA-WT939
Report on Addendum Report for Project 4.1. (U) Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The physical factors and dosimetry of the fall out on the Marshall Islands from the first shot of Operation CASTLE are discussed. Data was summarized from field Radiological Safety sur veys, fallout radiochemical studies, and fallout gamma spectral measurements. The influence of these and other factors on an evaluation of sur vey meter response and total dose estimates was considered. Estimates of fallout duration times and energy distribution of the dose from a plane source were made and the effect of diffuse source-geometry on the depth-dose to air-dose relationship was considered. Superficial doses from soft gamma and beta radiation were also considered. (Author)

AD-828 637/9 PC **A02**/MF **A01**
Naval Radiological Defense Lab., San Francisco, CA.
The Nature of Individual Radioactive Particles. I. Surface and Underground Abd Particles from Operation Jangle,
C. E. Adams, and I. G. Poppoff. 28 Nov 52, 19p
Rept no. USNRDL-374
Distribution limitation now removed.

Thin sections of a large number of radioactive fallout particles from Operation JANGLE were made. The thin sections were studied under a petrographic microscope and then radioautographed. It was found that the particles were composed almost wholly of glass with varying amounts of included mineral fragments and air bubbles. The radioactivity was distributed irregularly throughout the particles. (Author)

AECL-6317 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Organic Coolant in Winnipeg Riverbed Sediments.
J. E. Guthrie, and O. E. Acres. Mar 79, 29p
U.S. Sales Only.

Between January and May 1977 a prolonged leak of organic coolant occurred from the Whiteshell Nuclear Research Establishment's nuclear reactor, and a minimum of 1450 kg of coolant entered the Winnipeg River and was deposited on the riverbed. The level of radioactivity associated with this coolant was low, contributing less than 0.2 mu Gy (0.02 mrad) a year to the natural background gamma radiation field from the riverbed. The concentration of coolant in the water samples never exceeded 0.02 mg/L, the lower limit of detection. The mortality of crayfish, held in cages where the riverbed was covered with the largest deposits of coolant, was not significantly different from that in the control cages upstream of the outfall. No evidence of fish kill was found. (Atomindex citation 11:525363)

CEA-R-5017 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Study of the Distribution of gamma-Emitting Radionuclides in Coastal Biological Indicators of the Channel and Northern Sea Shores from February 1976 to February 1978.
P. Germain, M. Masson, and Y. Baron. Nov 79, 55p
In French.
U.S. Sales Only.

Samples of fauna and flora from the French coast of the Channel and Northern Sea were taken for GeLi gamma spectrometry, from February 1978. The measurements as a whole showed that exp 144 Ce-Pr, exp 125 Sb, exp 7 Be, exp 103 Ru, exp 106 Ru-Rh, exp 137 Cs, exp 95 Zr-Nb, sup(110m)Ag, exp 134 Cs, exp 54 Mn, exp 65 Zn, exp 60 Co, exp 140 La, exp 140 Ba, exp 131 I, exp 147 Nd and exp 40 K could be detected. Quantitatively, exp 106 Ru-Rh and exp 144 Ce-Pr were the prevailing elements. At Goury, a station close to the emissary of the fuel reprocessing plant of La Hague, throughout the period of investigation, radioactivity levels were in the range of 10-100 pCi/g dry and 1-10 pCi/g dry for exp 106 Ru-Rh and exp 144 Ce-Pr respectively. The recorded levels of the other man-made radionuclides can be considered quantitatively as very low, under 1 pCi/g dry, which comparatively is lower than the natural radioactivity of exp 40 K ranging between 1 and 100 pCi/d dry. The values observed in 1976-1978 are lower than in 1975. It is difficult to set up monthly rela-

tions between levels in species and amounts of releases. In spite of these low levels, a decrease was observed in the coastal biological indicators a a function of the distance from the release point, especially clear for exp 106 Ru-Rh. However, this observation is not general; for instance exp 137 Cs a soluble element, easily dispersed in seawater, showed a rather homogeneous distribution in each coastal species. Besides, exp 125 Sb in the alga species Pelvetia canaliculata, seemed, to present a gradient in opposition to common dispersion laws; this process might result from a slow evolution of the element from a non-adsorbable to a slightly adsorbable form. (Atomindex citation 11:525285)

CONF-801038-17 PC **A02**/MF **A01**
Idaho Chemical Corp., Idaho Falls.
Comparison of HEPA Filter Test Methods in Corrosive Environments.
L. P. Murphy, S. J. Fernandez, and B. G. Motes. 1980, 22p
Contract AC07-79ID01675
16. DOE nuclear air cleaning conference, San Diego, CA, USA, 20 Oct 1980.

The in-plant testing of process off-gas high efficiency particular air (HEPA) filters is an important quality control activity of the ALARA (As Low As Reasonably Achievable) policy at nuclear facilities. Imprecise and irreproducible data were recorded during DOP testing at the Atmospheric Protection System (APS) of the Idaho Chemical Processing Plant (ICPP). The tests at the APS are performed in an environment that has high humidity, high temperatures and has NO/sub x/ present. An evaluation of three HEPA filter test methods in corrosive environments was conducted: the dioctyl phthalate (DOP) method (US Standard Method ANSI N-101.1-1979) the sodium chloride method (British Standard 3928:1969), and the soda-fluorescein or uranine method (French Standard AFNOR STD NFX 44-011). The effects of high humidity, temperature, and oxides of nitrogen (NO/sub x/) on each method was examined. The effects of each variable and any interaction between variables on the test methods were examined. Recommendations ior changes in the standard methods to reduce erratic on-line results are presented. (ERA citation 06:005282)

EGG-1183-1772 PC **A02**/MF **A01**
EG and G, Inc., Santa Barbara, CA. Energy Measurements Group.
Aerial Radiological Survey of the Nuclear Engineering Company (NECO) Facility and Surrounding Area, Sheffield, Illinois.
Sep 79, 9p
Contract AC08-76NV01183

An aerial radiological survey to measure terrestrial gamma radiation was carried out over the Nuclear Engineering Company (NECO) facility located near Sheffield, Illinois. Gamma ray data were collected over a 13 km exp 2 area enclosing the facility by flying north-south lines spaced 91 m apart. Processed data indicated that detected radioisotopes and their associated gamma ray exposure rates were consistent with those expected from normal background emitters. Estimated exposure rates 1 m above the ground, as calculated from the aerial data, are presented in the form of an isopleth map. No ground sample data were taken at the time of the aerial survey. (ERA citation 06:005293)

EML-383 PC **A16**/MF **A01**
Department of Energy, New York. Environmental Measurements Lab.
Regional Baseline Station, Chester, New Jersey.
H. L. Volchok. Oct 80, 369p

Twelve of the fourteen sections were abstracted and indexed individually for EDB/ERA. Six of them are in scope for INIS. (ERA citation 06:006453)

INIS-mf-5663 PC **A04**/MF **A01**
Department of the Environment, London (England).
Annual Survey of Radioactive Discharges in Great Britain 1978.
Sep 79, 66p
U.S. Sales Only.

Details are given of main discharges to the environment of radioactive waste in 1978 together with those in 1977 and 1976 for comparison with comment on the environmental effect of the discharges in 1977. The statutory control over the discharges of radioactive wastes in Great Britain is outlined in the Introduction. Details of the discharges are set out in tabular form, grouped under: UKAEA establishments; the Radiochemical Centre Limited; British Nuclear Fuels Limited; CEGB and SSEB nuclear power stations; Ministry of Defence. Part 7 deals with radioactivity in drinking waters and rivers. (Atomindex citation 11:524976)

MLM-2738(OP) PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Secular Equilibrium of Radium in Western Coal.
V. R. Casella, J. G. Fleissner, and C. E. Styron. 1980, 7p CONF-801227-1
Contract AC04-76DP00053
Atomic and nuclear methods in fossil energy research meeting, Mayaguez, Puerto Rico, 1 Dec 1980.

Concentrations of radium-226, radium-228, and thorium-228 in coal from six Western states have been measured by gamma spectroscopy. The existence of secular equilibrium was verified for radium-226 and previously measured uranium-238 and also for radium-228 and thorium-228. The measured radionuclide concentrations for Western coal averaged about 0.3 pCi/g for radium-226 and 0.2 pCi/g for radium-228 and thorium-228. These average values are not greatly different from those in coal from other provinces of the United States. (ERA citation 06:005684)

MLM-2789 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Radon Monitoring Program, May-July 1980.
W. G. Yates, G. R. Hagee, and P. H. Jenkins. 10 Dec 80, 15p
Contract AC04-76DP00053

Radon concentration measurements at 50 locations in the monitoring network at Canonsburg, Pa., are reported for the quarterly period of April 29 to July 28, 1980. In addition, a summary of all data from the date of initiation of the network (covering the period January 29 to July 28, 1980) is presented for comparison purposes. Average background in the Canonsburg area for the quarterly period was 0.21 pCi/liter with a range of 0.16 to 0.26 pCi/liter. This compares with an average for the first quarter of 0.18 pCi/liter and a range of 0.12 to 0.23 pCi/liter. Concentrations ranging from 0.27 to 0.75 pCi/liter at 17 locations exceeded the background range. These locations are predominantly downwind of the site in an easterly direction. A similar pattern is evident from the summary of data for the first two quarters. (ERA citation 06:006459)

NUREG/CR-1240-V-1 PC **A06**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
LWR (Light Water Reactor) Pressure Vessel Irradiation Surveillance Dosimetry.
Quarterly progress rept. Jan-Mar 80,
G. L. Guthrie, and W. N. McElroy. Dec 80, 124p
HEDL-TME-79-41
See also report for Oct-Dec 78, NUREG/CR-0720.

The report describes progress made in the Light Water Reactor Pressure Vessel Irradiation Surveillance Dosimetry Program during the reporting period. The primary objective of the multi-laboratory program is to prepare an updated and improved set of dosimetry, damage correlation, and associated reactor analysis ASTM Standards for LWR-PV irradiation surveillance programs. Supporting this objective are a series of analytical and experimental validation and calibration studies in 'Standard, Reference, and Controlled Environment Benchmark Fields', reactor 'Test Regions', and operating power reactor 'Surveillance Positions'.

NUREG/CR-1240-V-3 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
LWR (Light Water Reactor) Pressure Vessel Irradiation Surveillance Dosimetry.
Quarterly progress rept. Jul-Sep 79,
G. L. Guthrie, and W. N. McElroy. Dec 80, 57p
HEDL-TME-80-2

The report describes progress made in the Light Water Reactor Pressure Vessel Irradiation Surveillance Dosimetry Program during the reporting period.

NUREG/CR-1240-V-4 PC **A08**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
LWR (Light Water Reactor) Pressure Vessel Irradiation Surveillance Dosimetry.
Quarterly progress rept. Oct-Dec 79,
G. L. Guthrie, and W. N. McElroy. Dec 80, 160p
HEDL-TME-80-3

The report describes progress made in the Light Water Reactor Pressure Vessel Irradiation Surveillance Dosimetry Program during the reporting period.

NUREG/CR-1241-V-1 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
LWR (Light Water Reactor) Pressure Vessel Irradiation Surveillance Dosimetry.
Quarterly progress rept. Jan-Mar 80,
G. L. Guthrie, and W. N. McElroy. Dec 80, 61p
HEDL-TME-80-4
See also report for Oct-Dec 78, NUREG/CR-0720.

The report describes progress made in the Light Water Reactor Pressure Vessel Irradiation Surveillance Dosimetry Program during the reporting period. The primary objective of the multi-laboratory program is to prepare an updated and improved set of dosimetry, damage correlation, and associated reactor analysis ASTM Standards for LWR-PV irradiation surveillance programs. Supporting this objective are a series of analytical and experimental validation and calibration studies in 'Standard, Reference, and Controlled Environment Benchmark Fields', reactor 'Test Regions', and operating power reactor 'Surveillance Positions'.

NUREG/CR-1387 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Sediment and Radionuclide Transport in Rivers; Field Sampling Program, Cattaraugus and Buttermilk Creeks, New York.
Annual progress rept. Oct 78-Sep 79,
Y. Onishi, W. H. Walters, and R. M. Ecker. Jan 81, 70p PNL-3329
See also report for Oct 77-Sep 78, PB-293 417.

This report describes FY-1979 analysis results on flow, sediment and radionuclide data collected in Cattaraugus, Buttermilk and Franks Creek, New York. the objective of this study is to investigate the radionuclide transport in these streams as part of a continuing program to provide data required for application and verification of the Sediment and Radionuclide Transport Model (SERATRA). Radiological analyses were peformed on sand, silt and clay size fractions of suspended and bed sediment, as well as for dissolved radionuclides.

NUREG-0749 PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Material Safety and Safeguards.
Environmental Assessment Related to the Operation of Hansen Uranium Mill Project, WM-24, Cyprus Mines Corporation.
Jan 81, 191p

An environmental assessment was prepared by the staff of the U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, in response to a request for technical assistance from the State of Colorado in connection with licensing action on the proposed Cyprus Mines Corporation, Hansen uranium project. The major components of discussion are (1) a summary and recommended licensing conditions, (2) a description of the site environment and the proposed facility operation as well as alternatives in comparison with NRC's performance objectives for tailings management, and (3) a radiological assessment for estimating the facility's compliance with 10 CFR 20 and 40 CFR 190 dose regulations. The NRC recommends licensing the proposed mill subject to stipulated license conditions.

ORNL/TM-6402 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Sources of Tritium.
J. E. Phillips, and C. E. Easterly. Dec 80, 60p

Contract W-7405-ENG-26

A review of tritium sources is presented. The tritium production and release rates are discussed for light water reactors (LWRs), heavy water reactors (HWRs), high temperature gas cooled reactors (HTGRs), liquid metal fast breeder reactors (LMFBRs), and molten salt breeder reactors (MSBRs). In addition, release rates are discussed for tritium production facilities, fuel reprocessing plants, weapons detonations, and fusion reactors. A discussion of the chemical form of the release is included. The energy producing facilities are ranked in order of increasing tritium production and release. The ranking is: HTGRs, LWRs, LMFBRs, MSBRs, and HWRs. The majority of tritium has been released in the form of tritiated water. (ERA citation 06:004862)

PB81-153389 PC **A03**/MF **A01**
Office of Radiation Programs, Las Vegas, NV.
Radioactive Emissions from Yellowcake Processing Stacks at Uranium Mills.
Technical note,
Charles W. Fort, Jr., Richard L. Douglas, and William E. Moore. Oct 80, 48p ORP/LV-80-3

A sampling program was undertaken to evaluate the releases of uranium concentrate from uranium mills. This concentrate, known as yellowcake, is the final product of the mill. It is routinely released to the environment through stacks which exhaust air from both the yellowcake drying and packaging operations. During this study, samples were taken in these stacks at six mills to evaluate the total yellowcake emission rates. This paper describes the sampling and analytical methods used, and presents the results obtained.

PB81-153686 PC **A04**/MF **A01**
Environmental Protection Agency, New York. Region II.
Region II 1978-79 ERAMS Summary Data Report,
J. Feldman, and P. Mathews-Musumeci. Oct 80, 52p EPA-902/4-80-003

This report contains data obtained from the Region II ERAMS stations during 1978 and 1979. Methods and procedures of collection and analysis are described. Data are summarized in table form and analyzed to determine any changes in the radiological quality of the environment. Analysis of the data shows that levels of radionuclides were well within Federal limits for air, water, and milk. Levels were relatively consistent during the two-year period. There were no measurable increases in the levels of radionuclides attributable to the TMI incident.

PNL-3606 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Environmental Radiation Safety: Plutonium/Soil Interactions for Plutonium Particles in Soil.
O. R. Moss, E. J. Rossingnol, W. C. Cannon, and D. L. Stevens. Dec 80, 48p
Contract AC06-76RL01830

The goal of this project is to provide information useful in estimating hazards related to resuspension characteristics and subsequent aerodynamic behavior of aerosols from a mixing of soil and exp 238 PuO sub 2 . Experiments were carried out to determine whether simple models, used to predict the total activity concentration of resuspended particles, need to be modified to account for changes in the exp 238 PuO sub 2 activity distribution on resuspended particles due to aging of the soil mixture under humid or dry conditions. A literature search revealed that one model, based on the suspension factors, S/sub f/, may be a useful predictor of hazard reduction irrespective of site. Our experiments demonstrated little or no change in the activity of resuspended particles following humid or dry aging of the soil- exp 238 PuO sub 2 mixture. Additional terms for activity distribution changes should not be needed for the simple resuspension hazard model. (ERA citation 06:006472)

RFP-3118 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Soil Decontamination Study, DOE Facilities.
J. A. Hayden, P. M. Arnold, J. R. Stevens, R. L. Kochen, and K. Y. Gallagher. 1980, 49p CONF-800753-2

Contract AC04-76DP03533
US DOE transuranic waste management program decontamination technology transfer meeting, Richalnd, WA, USA, 29 Jul 1980.

Research activities related to soil decontamination at Rocky Flats are summarized. The prospect of using soil decontamination methods for decontaminating transuranic (TRU) wastes is good. The approach is to remove the activity by attrition scrubbing followed by dispersion. Significant similarities and differences among soils from 5 DOE sites are discussed. Current guidelines for contaminated soils (actinides) are listed. Criteria for the disposition soil generated in the decontamination process are given. Several decontamination tests are described. (ERA citation 06:005295)

RISO-R-404 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Environmental Radioactivity in the Faroes in 1978.
A. Aarkrog, H. Hansen, and J. Lippert. Jul 79, 29p
U.S. Sales Only.

Measurements of fallout radioactivity in the Faroes in 1978 are presented. Strontium-90 (and exp 137 Cs in most cases) was determined in regularly collected samples of precipitation, grass, milk, fish, sea water, bread, and drinking water. In addition, analyses were made of spot samples of lamb, sea birds, potatoes, sea plants, vegetables, eggs, and human bone. Tritium was determined in samples of drinking water. Estimates are given of the mean contents of exp 90 Sr and exp 137 Cs in the human diet in the Faroes in 1978. (Atomindex citation 11:525023)

RISO-R-405 PC **A02**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Environmental Radioactivity in Greenland in 1978.
A. Aarkrog, H. Hansen, and J. Lippert. Jul 79, 22p
U.S. Sales Only.

Measurements of fallout radioactivity in Greenland in 1978 are reported. Strontium-90 (and Cesium-137 in most cases) was determined in samples of precipitation, sea water, vegetation, animals, and drinking water. Tritium was determined in samples of drinking water. Estimates are given of the mean contents of exp 90 Sr and exp 137 Cs in the human diet in Greenland in 1978. (Atomindex citation 11:525024)

SSI-2-1979 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Airborne Radioactivity in Sweden - Quarterly Report from the National Institute of Radiation.
1979, 8p
In Swedish and English.
U.S Sales Only.

The concentrations in the air near the ground at three locations in Sweden of 18 gamma-emitting radionuclides measured in the second quarter of 1979 are given. One of the radionuclides, Be 7 is formed by cosmic radiation in the atmosphere, the others are from nuclear weapon tests. (Atomindex citation 11:525051)

SSI-3-1979 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Airborne Radioactivity in Sweden - Quarterly Report from the National Institute of Radiation Protection.
1979, 8p
In Swedish and English.
U.S. Sales Only.

The concentrations in the air near the ground at three locations in Sweden of 18 gamma-emitting radionuclides neasured in the third quarter of 1979 are given. One of the radionuclides is Be 7, formed by cosmic radiation in the atmosphere, the others are from nuclear weapon tests. (Atomindex citation 11:525052)

UCID-18838 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Program Plan: Field Radionuclide Migration Studies in Climax Granite.
D. Isherwood, E. Raber, D. Coles, and R. Stone. 1 Nov 80, 66p
Contract W-7405-ENG-48

This Program Plan describes the field radionuclide migration studies we plan to conduct in the Climax granite at the Nevada Test Site. Laboratory support studies are included to help us understand the geochemical and hydrologic processes involved in the field. The Program Plan begins with background information (Section 1) on how this program fits into the National Waste Terminal Storage Program Plan and discusses the needs for field studies of this type. The objectives stated in Section 2 are in direct response to these needs, particularly the need to determine whether laboratory studies accurately reflect actual field conditions and the need for field testing to provide a data base for verification of hydrologic and mass transport models. The technical scope (Section 3) provides a work breakdown structure that integrates the various activities and establishes a base for the technical approach described in Section 4. Our approach combines an interactive system of field and laboratory migration experiments with the use of hydrologic models for pre-test predictions and data interpretation. Section 5 on program interfaces identifies how information will be transferred to other related DOE projects. A schedule of activities and major milestones (Section 6) and the budget necessary to meet the project objectives (Section 7) are included in the Program Plan. Sections 8 and 9 contain brief descriptions of how the technical and program controls will be established and maintained and an outline of our quality assurance program. This program plan is an initial planning document and provides a general description of activities. An Engineering Test Plan containing detailed experimental test plans, an instrumentation plan and equipment design drawings will be published as a separate document. (ERA citation 06:006474)

18I. Reactor Engineering and Operation

CEA-CONF-4721 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Synthesis of Radioactive Accidents Occurred at the Nuclear Studies Center of Saclay from 1973 to 1978 in Laboratories Using Low Activity Sealed.
J. C. Moreau, H. Vialettes, and J. P. Perotin. 1979, 10p CONF-790181-1
In French.SFRP session on safety in handling of low activity unsealed sources, Fontenay-aux-Roses, France, 17 Jan 1979.
U.S. Sales Only.

Each accident is analysed by the following method: all accidents are the logical of variations with respect to a stable previous situation. The analysis consists to draw up an inventory of these variations and search for links between them. Comparison between analysis of several accidents brings out accidents factors. Actual accidents are analyzed to determine these factors. (Atomindex citation 11:521993)

CEA-CONF-4741 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
DOMPAC Dosimetry Experiment. Neutronic Simulation of the Thickness of a PWR Pressure Vessel. Irradiation Damages.
A. Alberman, M. Faure, M. Thierry, O. Hoclet, and A. Le Dieu de Ville. 1979, 21p CONF-791051-24
In French.ASTM-EURATOM symposium on reactor dosimetry, Ispra, Italy, 1 Oct 1979.
U.S. Sales Only.

For suitable extrapolation of irradiated PWR ferritic steel results, proper irradiation of the pressure vessel has been 'simulated' in test reactor. For this purpose, a huge steel block (20 cm in depth) was loaded with Saclay's graphite (GAMIN) and tung-

sten damage detectors. Core-block water gap was optimized through spectrum indexes method, by ANSN and SABINE codes so that spectrum in 1/4 thickness matches with ANISN computations for PWR Fessenheim 1. A good experimental agreement is found with calculated dpa damage gradient. 3D Monte Carlo computation (TRIPOLI), was performed on the DOMPAC device, and spectrum indexes evolution was found consistent with experimental results. Surveillance rigs behind a 'thermal shield' were also simulated, including damage and activation monitors. Dosimetry results give an order of magnitude of accuracies involved in projecting steel sample embrittlement to the pressure vessel. (Atomindex citation 11:525818)

CEA-CONF-4819 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
Non Linear Analysis of Shells (Large Displacements): Use of the Equilibrium Equations Based on the Deformed Body.
A. Combescure, and A. Hoffmann. 1979, 12p
CONF-790802-88
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

Formulations of geometrical nonlinearities of structures are generally based on the initial configuration. It is shown how to write the equilibrium equations on the deformed body, give several algorithms to solve the problem, and make comparisons between computed, analytical and experimental results. A body C is considered at two different instants t sub 1 and t sub 2 . At time tsub(i) the body has the configuration Csub(i) and the applied forces are Fsub(i). It is supposed that the equilibrium is achieved at time t sub 1 and the equilibrium equations are solved on the unknown configuration C sub 2 . One comparison with analytical results is presented. Two examples of applications of industrial interest, where plasticity is combined with large displacement, are compared with experimental results: very thin circular plate loaded by a high pressure (axisymmetric); three dimensional study of a pipe elbow subjected to in plane bending. (Atomindex citation 11:525831)

CEA-CONF-4820 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
Crack Growth Rate of PWR Piping.
M. Bethmont, J. J. Doyen, and J. Lebey. 1979, 19p
International conference on structural mechanics in reaactor technology, Berlin, Germany, F.R. 13 - 17 Aug 1979.
U.S. Sales Only.

The Aquitaine 1 program, carried out jointly by FRAMATOME and the CEA is intended to improve knowledge about cracking mechanisms in AISI 316 L austenitic stainless steel under conditions similar to those of the PWR environment (irradiation excluded). Experiments of fatigue crack growth are performed on piping elements, scale 1/4 of primary pipings, by means of internal hydraulic cyclic pressure. Interpretation of results requires a knowledge of the stress intensity factor Ksub(I) at the front of the crack. Results of a series of calculations of Ksub(I) obtained by different methods for defects of finite and infinite length (three dimensional calculations) are given in the paper. The following have been used: calculations by finite elements, calculations by weight function. Notches are machined on the test pipes, which are subjected to internal hydraulic pressure cycles, under cold conditions, to initiate a crack at the tip of the notch. They are then cycled at a frequency of 4 cycles/hour on on water demineralised loop at a temperature of 280 exp 0 C, the pressure varying at each cycle between approximately 160 bars and 3 bars. After each test, a specimen containing the defect is taken from the pipe for micrographic analysis. For the first test the length of the longitudinal external defect is assumed infinite. The number of cycles carried out is 5880 cycles. Two defects are machined in the tube for the second test. The number of cycles carried out is N = 440. The tests are performed under hot conditions (T = 280 exp 0 C). For the third test two defects are analysed under cold and hot conditions. The number of cycles carried out for the external defect is 7000 when hot and 90000 when cold. The number of cycles for the internal defect is 1650 when hot and 68000 when cold. (Atomindex citation 11:525891)

CEA-CONF-4824 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Surete Nucleaire.
Test and Calculation of the Local Behaviour of Concrete Structures under Missile Impact.
C. Berriaud, P. Verpeaux, A. Hoffmann, P. Jamet, and R. Avet-Flancard. 1979, 6p CONF-790802-86
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

A reliable formula is now available to calculate the thickness of a reinforced concrete wall so that there is no perforation. It must be reminded that this formula can be applied only within its validity range. In the near future, we hope to solve two important problems: the effects of the missile nose shape and of the concrete ageing. In other hand we have a calculation code which seems efficient up to concrete degradation. Studies are in progress to fully qualify it. (Atomindex citation 11:525369)

COO-4057-13(V.3) PC **A12**/MF **A01**
United Engineers and Constructors, Inc., Philadelphia, PA.
Gas Reactor International Cooperative Program. Pebble Bed Reactor Plant: Screening Evaluation. Volume 3. Appendix A. Equipment List.
Nov 79, 255p
Contract EN-77-C-02-4057

This report consists of three volumes which describe the design concepts and screening evaluation for a 3000 MW(t) Pebble Bed Reactor Multiplex Plant (PBR-MX). The Multiplex plant produces both electricity and transportable chemical energy via the thermochemical pipeline (TCP). The evaluation was limited to a direct cycle plant which has the steam generators and steam reformers in the primary circuit. Volume 1 reports the overall plant and reactor system and was prepared by the General Electric Company. Core scoping studies were performed which evaluated the effects of annular and cylindrical core configurations, radial blanket zones, burnup, and ball heavy metal loadings. The reactor system, including the PCRV, was investigated for both the annular and cylindrical core configurations. Volume 3 is an Appendix containing the equipment list for the plant and was also prepared by United Engineers and Constructors, Inc. It tabulates the major components of the plant and describes each in terms of quantity, type, orientation, etc., to provide a basis for cost estimation. (ERA citation 06:004785)

JAERI-M-8300 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Prediction of ROSA-III Experiment Run 703.
Y. Koizumi, K. Soda, and O. Kikuchi. Jun 79, 95p
In Japanese.
U.S. Sales Only.

The purpose of the ROSA-III experiment with a scaled BWR test facility is to examine primary coolant thermal-hydraulic behavior and performance of ECCS during a postulated loss-of-coolant accident of BWR. The results provide information for verification and improvement of reactor safety analysis codes. Run 703 assumes a recirculation line double-ended break at the pump suction under an average core power with actuation of ECCS (HPCS, LPCS, LPCI and ADS). Prediction of the Run 703 experiment was made with computer code RELAP4J. HPCS started 27 sec after the break, LPCS 53.9 sec and LPCI 66.9 sec. Heater-rod surfaces were in dryout condition from 9 to 33 sec after the break for the longest duration. A maximum heater-rod surface temperature was 500 exp 0 C. (Atomindex citation 11:525376)

JAERI-M-8355 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Mark II Containment 1/6-Scale Pressure Suppression Test Program: Data Report No. 2. Runs Performed January-June, 1977, for the Japanese BWR Owners' Group.
Y. Kukita, M. Okazaki, K. Namatame, and M. Shiba. Aug 79, 132p
In Japanese.
U.S. Sales Only.

This report documents experimental data from the first test phase of the Mark II Containment 1/6-Scale Pressure Suppression Test. The 1/6-Scale Test was initiated in December, 1976, to investigate the thermohydraulic responses of a BWR Mark II pressure suppression system to a postulated loss-of-coolant accident (LOCA), by means of scale model experiments. From January to June, 1977, a series of tests were performed for the Japanese BWR Owners' Group. These tests consisted of eight air-blowdown pool swell tests, three steam-blowdown pool swell tests, and twelve steam condensation tests. The dynamic responses of pressure and pool water level during the blowdown, pressure oscillation and chugging phenomena associated with unsteady condensation of steam were measured. (Atomindex citation 11:525882)

JAERI-M-8442 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Computer Code HYDRO-ACE for Analyzing Thermo-Hydraulic Phenomena in the BWR Core.
K. Abe, and Y. Naito. Oct 79, 91p
In Japanese.
U.S. Sales Only.

A computer code HYDRO-ACE has been developed for analyzing thermo-hydraulic phenomena in the BWR core under forced or natural circulation of cooling water. The code is composed of two main calculation routines for single channels such as riser, separator, and downcommer and multiple channels such as the reactor core with a heated zone. Functionally the code is divided into many subroutines to be connected straightforwardly, and so that the user can choose a given course freely by simply arranging the subroutines. In the program, void fraction is calculated by Maurer's method, two-phase frictional pressure drop by Maltinelli-Nelson's, and critical heat flux ratio by Hench-Levy's. The coolant flow distributions in the JPDR-II core calculated by the code are in good agreement with those measured. (Atomindex citation 11:526131)

JAERI-M-8473 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Post-Test Analysis of ROSA-III Test Run 701.
K. Soda, O. Kikuchi, and Y. Koizumi. Oct 79, 114p
U.S. Sales Only.

Post-test analysis of ROSA-III test Run 701, the first simulated BWR/LOCA experiment in the ROSA-III program, was made by a computer code, RELAP4J. Objectives of the analysis were to evaluate ability of the code to predict thermal hydraulic behavior of coolant by comparing the analytical results with the test data, to show areas of model refinement and to reveal requirements in the program. Analysis showed the following: 1) Calculation model to give a maximum flow rate at low quality is important in determining coolant behavior in the system. 2) The phase separation model in the lower plenum influences calculation of the discharge quality at the break and hence that of coolant behavior in the system. 3) Overall behavior of coolant can be well predicted. 4) Effect of ECC water cannot be well predicted by RELAP4J. Following are the requirements in future tests: 1) measurement of the initial pressure distribution in the system, 2) improvement or development of two-phase flow instrumentations, especially in flow rate measurement, 3) simplification of the feed water and steam discharge lines. In future analysis, emphasis should be placed on prediction of ECC water behavior, evaluation of heat transfer correlation and realistic evaluation of liquid level in the core. (Atomindex citation 11:525884)

JAERI-M-8482 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.

FREG-3T: A Computer Program to Analyze LWR Fuel Behavior under Accident Conditions.
M. Uchida, Y. Harayama, and N. Ohtsubo. Oct 79, 56p
In Japanese.
U.S. Sales Only.

A computer program FREG-3T was developped for analysis of LWR fuel behaviors under accident or transient conditions. The program, which is based on FREG-3, a program to evaluate fuel-clad gap conductance under normal operation conditions, is added with transient heat conduction calculation capability, fuel surface heat transfer models, and high-temperature materials property data necessary to make accident analysis. According to input data of power history and coolant conditions, the program calculates fuel temperature, inner gas pressure and deformation distributions in a single rod. Models are formulated considering the conditions anticipated for large-break loss of coolant accident. As the first step toward a practical accident analysis code, the program is still limited in capability. However, the agreement between calculation and experiment is rather good in fuel center temperature under normal operations, out-pile swelling of Zircaloy tubes, in-pile LOCA simulation experiments, etc. (Atomindex citation 11:526140)

JAERI-M-8483 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Analysis of CSNI Standard Problem No.6 by ALARM-B1 Computer Code.
S. Sasaki. Oct 79, 74p
U.S. Sales Only.

Presented in this report are the results of a computer simulation of the CSNI International Standard Problem No.6 (ISP6) by the ALARM-B1 code. The aim of this standard problem is particularly to examine the capability of analytical models relating to the two-phase mixture level and the discharge mass flow rate using the individual participants' computer codes. The theoretical predictions were performed to explore the separate effects during the initial three seconds attended with a non-equilibrium physical phenomenon. The ISP6, which is based on the Battelle Frankfurt experiment duplicating a BWR steam line break accident, might not be appropriate as a bench mark problem of the ALARM-B1 program (version 2), because it contains an unreasonable demand treating a thermal non-equilibrium process with an equilibrium model. Apart from the pressure history arising from the non-equilibrium feature, the transient steam-water interface in the vessel was tracked sufficiently by using the bubble-rise-model incorporated in the ALARM-B1 code. In addition, the calculated mass flow rate at the exit plane during the steam phase blowdown was correct within the 15% experimental error bands. (Atomindex citation 11:525389)

KFK-2884-B PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Nukleare Sicherheit.
Pre-Calculations for Vibration Tests with a Thin-Walled, Fluid-Filled Cylindrical Shell. Test Configuration A.
G. Hailfinger, and R. Krieg. Nov 79, 34p
In German.
U.S. Sales Only.

In order to support investigations in dynamic fluid structure interaction carried through within the HDR-program, additional laboratory tests have been planned. One type of tests concerns the eigenfrequencies and deformation modes of a thin-walled, fluid-filled circular shell. Final goal is the verification of recently developed computational methods in dynamic fluid structure interaction. In this report the pre-calculations for test configuration A are documented. The axis of the circular shell is vertical. The fluid inside the shell is water with a free fluid surface at the top. The structural dynamic behavior of the shell without water has been analyzed with the FEM program STRUDL/DYNAL. The fluid dynamics of the water and the fluid structure interaction have been described with the BIE program SING-S. (Atomindex citation 11:525373)

NUREG/CR-1157-V-3 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Thermal/Hydraulic Analysis Research Program.
Quarterly rept. Jul-Sep 80,
S. L. Thompson. Jan 81, 115p SAND-80-1091/3OF4
See also report for Apr-Jun 80, NUREG/CR-1157-V-2.

The goal of this study is the prediction of the probability distribution of peak clad temperature (PCT) in a pressurized water reactor (PWR) during a large break loss-of-coolant accident (LOCA). In the study, a limited number of thermal-hydraulic code predictions of PCT are statistically used to form response surface models. The response surfaces thus generated are then used in further statistical analyses to determine the sensitivity of PCT to various input parameter assumptions. The same thermal-hydraulic code calculations will also be used to form response surfaces for other core damage indicators which are more global in nature. Examples of global indicators are total clad oxidation and energy removed from the fuel during the transient. These quantities should be more representative of the overall core integrity after such a transient than PCT and, therefore, can be used to provide guidance in establishing thermal-hydraulic research priorities.

NUREG/CR-1507 PC **A99**/MF **A01**
Sandia National Labs., Albuquerque, NM.
LMFBR Accident Delineation Study. Phase I Final Report,
D. C. Williams, J. A. Sholtis, F. W. Sciacca, D. W. Varela, and M. Rios. Jan 81, 642p SAND-80-1267

The report covers an accident delineation study undertaken to organize and evaluate the available information concerning LMFBR accident sequences and to identify key phenomenological and system-response uncertainties. The study can help provide a basis for assessing the relative safety of different LMFBR designs and design options, and can eventually help establish LMFBR licensing criteria. The delineation described is the first of several steps in the iterative process of integrating the many diverse areas of LMFBR safety research. This phase has qualitatively delineated the accident sequences and established a framework of event trees and fault trees. Although quantification of risk was not a major goal of the first phase, qualitative estimates of relative probabilities have been assigned to event-tree branch points in areas where adequate information is available. This was done primarily to identify key uncertainties and phenomenologies rather than to quantify the event trees systematically. Since the Clinch River Breeder Reactor Plant is the best characterized of any U.S. LMFBR design, it has been used as the illustrative facility in the first phase of the study.

NUREG/CR-1630 PC **A05**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Joint In-Pile Equation-of-State Series on Nuclear Fuels at Sandia National Laboratories,
W. M. Breitung, K. K. Murata, K. O. Reil, and G. Schumacher. Nov 80, 89p SAND-80-1794
Prepared in cooperation with Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.).

The report summarizes the EOS work which is related to the new joint Sandia-KfK in-pile series. First, the preceding Sandia-series in the ACPR is described, including in-pile technique, analysis of results, and recommendations for future tests. Then the present status of the joint Sandia-KfK series is given. Emphasis is put on improvements in these new series compared to the first ACPR series. The third part of this report describes the work which is currently underway at KfK: the fabrication of high density uranium oxide crucibles for the in-pile tests. Over 50 figures give a complete overview about experimental techniques, present results and future work.

NUREG/CR-1645 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
The PWR (Pressurized Water Reactors) Loss-of-Coolant Accident Analysis Capability of the WRAP-EM System,
M. V. Gregory, and F. Beranek. Jan 81, 48p DPST-NUREG-80-1
Contract DE-AC09-76SR00001

The modular computational system known as the Water Reactor Analysis Package (WRAP) has been extended to provide the computational tools required to perform a complete analysis of loss-of-coolant accidents (LOCAs) in pressurized water reactors (PWR). The new system is known as the WRAP-EM (Evaluation Model) system and will be used by NRC to interpret and evaluate reactor vendor EM methods and computed results.

NUREG/CR-1738 PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.
An Advanced Thermohydraulic Simulation Code for Pool-Type LMFBRs (SSC-P CODE),
I. K. Madni, and E. G. Cazzoli. Jan 81, 106p
BNL-NUREG-51280
Contract DE-AC02-76CH00016

Models for components and processes that are needed for simulation of thermohydraulic transients in a pool-type liquid metal fast breeder reactor (LMFBR) plant are described. A computer code, SSC-P, has been developed as a part of the Super System Code (SSC) development project.

NUREG/CR-1787 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Experimental and Statistical Investigation of Thermally Induced Failure in Reactor Fuel Particles,
J. L. Lunsford, R. J. Imprescia, A. L. Bowman, and C. E. Radosevich. Jan 81, 27p LA-8547-MS
Contract W-7405-eng-36

An incomplete experimental study into the failure statistics of fuel particles for the high-temperature gascooled reactor (HTGR) is described. Fuel particle failure was induced by thermal ramping from room temperature to temperatures in the vicinity of 2273 K to 2773 K in 2 to 30 h and detected by the appearance of 85Kr in the helium carrier gas used to sweep the furnace. The concentration of krypton, a beta emitter, was detected by measuring the current that resulted when the helium sweep gas was passed through an ionization chamber.

NUREG/CR-1790 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
LMFBR Aerosol Release and Transport Program Quarterly Progress Report for January-March 1980,
T. S. Kress, and M. L. Tobias. Jan 81, 40p
ORNL/NUREG/TM-416
Contract W-7405-eng-26
See also report for Jul-Sep 79, NUREG/CR-1296.

The Aerosol Release and Transport (ART) Program is designed to investigate the release, transport, and behavior of radionuclides originating from severe accidents resulting in core melting. The experimental program is being conducted in the Fuel Aerosol Simulant Test (FAST) Facility (which also includes the CRI-III vessel), the Nuclear Safety Pilot Plant (NSPP) Facility, and the Containment Research Installation-II (CRI-II) Facility. The analytical effort is designed to support the experiments and to provide an independent assessment of the safety margins that exist for the assessment of the radiological consequences of a core meltdown accident. During this quarter, eight underwater capacitor discharge vaporization (CDV) tests were performed in the FAST Facility; in addition, ten tests were performed in the CRI-III Facility.

NUREG/CR-1811 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Nuclear Reactor Safety.
Quarterly progress rept. 1 Apr-30 Jun 80,
Michael G. Stevenson, and John C. Vigil. Jan 81, 71p LA-8607-PR
Contract W-7405-eng-36
See also report for 1 Jan-31 Mar 80, NUREG/CR-1654.

The quarterly report summarizes technical progress from a continuing nuclear reactor safety research program conducted at the Los Alamos Scientific Laboratory (LASL). The reporting period is from April 1 to June 30, 1980. The research effort concentrates on providing an accurate and detailed understanding of the response of nuclear reactor systems to a broad range of postulated accident conditions.

NUREG/CR-1823 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Description and Characterization of Evaluation Models in FRAPCON-1,
E. Thomas Laats, and Rosanna Chambers. Jan 81, 45p EGG-CAAP-5217

A preliminary set of nine evaluation models to obtain thermal conservatism in fuel rod behavior calculations was added to the FRAPCON-1 computer code, a code used to calculate fuel rod behavior in a nuclear reactor during steady-state operation. Checkout and characterization of the evaluation models were performed, and conclusions were reached concerning their correctness of coding and relative performance for providing thermal conservatism.

NUREG/CR-1867 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Self-Mixing Phenomenology in Hypothetical Core-Disruptive Accidents,
E. J. Chapyak. Dec 80, 19p LA-8643-MS
Contract W-7405-eng-36

Physical processes are investigated that lead to the thermal equilibration of a disrupted liquid metal fast breeder reactor (LMFBR) core following a hypothetical core-disruptive accident (HCDA). Their impact is assessed, particularly as relating to the SIMMER code. The turbulent structure in the core region is characterized and bounding estimates are derived of thermal equilibration ('self-mixing') times. The implication of these results for LMFBR safety research is discussed briefly.

NUREG-0485-V-3-1 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Systematic Evaluation Program. Volume 3, Number 1.
Status summary rept. Nov 77-Nov 80.
Jan 81, 58p

The Systematic Evaluation Program is intended to examine many safety related aspects of eleven of the older light water reactors. This document provides the existing status of the review process including individual topic and overall completion status.

NUREG-0609 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Asymmetric Blowdown Loads on PWR (Pressurized-Water-Reactor) Primary Systems: Resolution of Generic Task Action Plan A-2,
S. B. Hosford, R. Mattu, R. O. Meyer, E. D. Throm, and C. G. Tinkler. Jan 81, 84p

NRC staff, after being informed of newly identified asymmetric loadings resulting from postulated ruptures of primary piping, initiated a generic investigation, Task Action Plan A-2, limited to pressurized-water-reactor (PWR) plants because of their higher primary system pressures. The intent of the investigation was to develop acceptable criteria and guidelines for evaluating plant analyses. The staff concludes that an acceptable basis is provided in this report for performing and reviewing plant analyses. Criteria were developed for evaluating loading transients, structural components, and the fuel assembly. The staff approved computer programs and modeling techniques submitted by each PWR vendor for development of the subcooled blowdown and cavity-pressure loading transients. Audit models were developed to evaluate the structural computer programs and modeling techniques. Methods have been approved for the structural-analysis method submitted by Westinghouse for the Indian Point Unit 3 plant. Criteria and guidelines are provided to perform a detailed evaluation of the fuel assembly. Acceptance criteria are also provided so deformed fuel-assembly spacer grids may be evaluated.

NUREG-0752 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Control Room Design Review Report for TMI-1. Metropolitan Edison Company, et al. Three Mile Island Nuclear Station Unit 1. Docket 50-289.
Dec 80, 45p

Based on human factors safety engineering review and evaluation of the TMI-1 control room, it is concluded that correction of the deficiencies identified and discussed prior to restart will permit safe operation of the TMI Unit 1 nuclear plant. Prior to restart, the control room will be audited to ensure that all human factors engineering improvements are implemented.

PATENT-4 184 514
Not available NTIS
Department of Energy, Washington, DC.
Valve System Incorporating Single Failure Protection Logic.
Patent,
R. Ryan, and W. J. H. Timmerman. Filed 11 Jan 78, patented 22 Jan 80, 4p PAT-APPL-868 634
Supersedes PAT-APPL-868 634-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A valve system incorporating single failure protective logic consists of a valve combination or composite valve which allows actuation or de-actuation of a device such as a hydraulic cylinder or other mechanism, integral with or separate from the valve assembly, by means of three independent input signals combined in a function commonly known as two-out-of-three logic. Using the input signals as independent and redundant actuation/de-actuation signals, a single signal failure, or failure of the corresponding valve or valve set, will neither prevent the desired action, nor cause the undesired action of the mechanism. (ERA citation 06:006076)

PB81-157216 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
U.S. Fast Breeder Reactor Program Needs Direction.
Report to the Congress.
22 Sep 80, 68p EMD-80-81
Eratta sheet inserted.

The United States nuclear fast breeder reactor program --is in a state of disarray, --lacks direction, and --costs hundreds of millions of dollars a year. Because of the fast breeder development strategy now being followed, the United States may not be able to have a commercially available technology if and when it is needed. The key to resolving these problems is a clear understanding and agreement between the Executive Branch and the Congress on the future role of nuclear energy in the United States' energy supply mix.

STUDSVIK/E4-79-22 PC **A06**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
FIX-II. Loca-Blowdown Heat Transfer and Pump Trip Experiments. Summary Report of Phase 1: Design of Experiments.
Y. Waaranperae, L. Nilsson, P. A. Gustafsson, and N. O. Jonsson. Jun 79, 111p
U.S. Sales Only.

FIX-II is a loss of coolant blowdown heat transfer experiment, performed under contract for The Swedish Nuclear Power Inspectorate, SKI. The purpose of the experiments is to provide measurements from simulations of a pipe rupture on an external recirculation line in a Swedish BWR. Pump trips in BWRs with internal recirculation pumps will also be simulated. The existing FIX-loop at the Thermal Engineering Laboratory of Studsvik Energiteknik AB will be modified and used for the experiments. Components are included to simulate the steam dome, downcomer, two recirculation lines with one pump each, lower plenum, core (36-rod full length bundle), control rod guide tubes, core bypass, upper plenum and steam separators. The results of the first phase of the project are reported. (Atomindex citation 11:525398)

STUDSVIK/K5-79-43 PC **A04**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Status Report on the Application of Process Noise Technique in Nuclear Power Plants.
R. Espefaelt, and F. Aakerhielm. Sep 79, 54p
U.S. Sales Only.

The report gives a survey of applications of noise technique reported for nuclear power plants. The scope has been limited to areas of interest for BWR and PWR plants of the types found in Sweden and with an emphasis on cases where the practical applicability has been clearly demonstrated. (Atomindex citation 11:525869)

18J. Reactor Materials

CEA-CONF-4688 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Testing Device for PWR Fuel Irradiation Isabelle Loop in the Osiris Experimental Reactor.
M. Lucot, and H. Vidal. 1979, 16p CONF-790646-9
In French.International colloquium on irradiation for reactor safety programmes, Petten, Netherlands, 25 Jun 1979.
U.S. Sales Only.

Description of an irradiation device to test PWR fuel pins in fast and thermal neutron flux. 1 to 4 pins can be irradiated in water under a pressure of 150 bar in a temperature range of 250-300 exp 0 C, a flow of 200g/s and a power of 400W/cm for each pin. Tests include normal, exceptional, transient or accidental conditions. First tests are briefly described. (Atomindex citation 11:521566)

CEA-CONF-4735 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Damage/Activation Ratio Measurements by Tungsten Dosimetry in Core and Periphery of Julich FRJ-2 Reactor.
A. Alberman, M. Thierry, W. Schneider, and L. Weise. 1979, 16p CONF-791051-26
ASTM-EURATOM symposium on reactor dosimetry, Ispra, Italy, 1 Oct 1979.
U.S. Sales Only.

Two tungsten damage detectors dosimetries were performed in core and periphery of heavy water moderated FRJ-2 reactor, where an irradiation program for damage/doses correlation in pressure vessel steel takes place. Environment in the 2 rigs is analysed through spectra calculations (SAND MX2) adjusted on a 'multifoil' activation dosimetry. W and steel dose rate are similar for d.p.a. model. Validation of the W detector response (electrical resistivity increase) for this model was proved in the core location, whence in periphery limit, important thermal to fast ratio induces difficult spectrum sensitivity correlation. (Atomindex citation 11:525820)

CEA-CONF-4739 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Required and Obtained Accuracy in the Dosimetry of Nuclear Reactor Pressure Vessel Steels.
A. Alberman, J. P. Genthon, P. Mas, and R. Perdreau. 1979, 8p CONF-791051-25
In French.ASTM-EURATOM symposium on reactor dosimetry, Ispra, Italy, 1 Oct 1979.
U.S. Sales Only.

The methods used to analyse steel irradiations by Saclay and Grenoble MTR Departments are presented, with the corresponding accuracy: experimental method and semi-theoretical method. (Atomindex citation 11:525819)

CEA-CONF-4752 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
DOMPAC: Neutronic Model and Experimental Damage. Characterization of a LWR - Pressure Vessel.
A. Alberman, and J. C. Nimal. 1979, 20p CONF-790974-3
Specialists meeting on accuracies in correlation between property change and exposure data from reactor pressure vessel steel irradiations, Julich, F.R. Germany, 24 Sep 1979.
U.S. Sales Only.

DOMPAC dosimetry has been designed for experimental confirmation of so far obtained data on ra-

diation damage to LWR pressure vessels. Steel block instrumented with Saclay's graphite (G.A.M.I.N.) and tungsten (W) detectors has been irradiated in LW test reactor TRITON. Core block distance was optimized in order to obtain a realistic 'entering' spectrum. Agreement was found between PV model computations and damage measurements. Surveillance capsule simulation gave an order of magnitude of accuracy for predicting damage to PV. Surveillance samples were proved representative of first 1/4 thickness of the vessel. (Atomindex citation 11:525817)

COO-2975-47 PC **A05**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Advanced Gas Cooled Nuclear Reactor Materials Evaluation and Development Program. Progress Report, April 1, 1980-June 30, 1980.
14 Nov 80, 96p
Contract AC02-76ET34202

Objectives of this program are to evaluate candidate alloys for Very High Temperature Reactor (VHTR) Nuclear Process Heat (NPH) and Direct Cycle Helium Turbine (DCHT) applications, in terms of the effect of simulated reactor primary coolant (helium containing small amounts of various other gases), high temperatures, and long time exposures, on the mechanical properties and structural and surface stability of selected candidate alloys. A second objective is to select and recommend materials for future test facilities and more extensive qualification programs. Work covered in this report includes the activities associated with the status of the simulated reactor helium supply system, testing equipment and gas chemistry analysis instrumentation and equipment. The progress in the screening test program is described; this includes: screening creep results and metallographic analysis for materials thermally exposed or tested at 750, 850 and 950 exp 0 C. The initiation of air creep-rupture testing in the intensive screening test program is discussed. In addition, the status of the data management system is described. (ERA citation 06:006047)

IAEA-R-2040-F PC **A12**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Demonstration and Development of Safeguards Techniques in the PNC Reprocessing Plant. Part of a Coordinated Programme on the Use of Installed Instrumentation in Fuel Reprocessing Facilities for Safeguards Purposes. Final Report for the Period 1 August 1977-31 July 1978.
H. Kurihara. Apr 79, 272p
U.S. Sales Only.

A hull-monitoring system in the Head-End facility and systems for surveillance and containment in the spent fuel receiving and storage facility at Tokai Reprocessing Plant are described. Operating experience on them is analyzed. (Atomindex citation 11:526126)

IM-1410 PC **A03**/MF **A01**
Swedish Inst. for Metal Research, Stockholm.
Unaxial Stress Relaxation and Creep Behaviour in Weldments of the Pressure Vessel Steel A533B Between 600 and 640 Degree C.
R. Otterberg. Oct 79, 28p
U.S. Sales Only.

In order to predict the stress reduction during stress relief heat treatment in welded joints of the pressure vessel steel A533B, uniaxial stress relaxation as well as creep tests have been performed. The specimens were isothermally stress relaxed between 600 and 640 degree C from initial stresses corresponding to specimen elongations of 0.25, 0.5 and 0.2 percent. The stress relaxation results are excellently described by a Norton relationship. The magnitude of the initial stress has been found to affect the stress relaxation in the beginning of the tests, but at times longer than one hour the effect is very small. Creep strain data from creep tests in the actual temperature interval was converted to describe stress relaxation behaviour as well. The results will be used in a forthcoming study to predict the multiaxial stress reduction in thick weldments of A533B. (Atomindex citation 11:525851)

INFCE/DEP/WG-4/3 PC **A02**/MF **A01**
INFCE Working Group 4. Secretariat.
Record of the Second Meeting of the Working Group, Tokyo, 19 May 1978.
May 78, 8p
U.S. Sales Only.

The items discussed include the record of the first meeting of the group, the reports from sub-group A and sub-group B, the draft report by Co-Chairmen for Group 4 to the TCC, the future work programme for Group 4 and sub-groups, and the numbering systems being used for papers. (Atomindex citation 11:542110)

JAERI-M-8407 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
FREC-3: A Computer Program to Analyze Stress and Strain of Fuel Rods in Accordance with Fuel-Rod Irradiation History. Calculation Procedure and Modeling.
Y. Harayama, F. Izumi, and M. Fujita. Aug 79, 75p
In Japanese.
U.S. Sales Only.

FREC-3 (Fuel Realiability Evaluation Code Version-3) analyzes the changes of fuel-rod design parameters in accordance with irradiation history, and evaluates the cladding strain, important fuel rods safety. The program is based on reports of the CYGRO developed by Westinghouse Electric Corporation (U.S.). This report describes the calculation procedure and models in FREC-3. (Atomindex citation 11:526136)

JAERI-M-8468 PC **A25**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Finite Element Method Programs to Analyze Irradiation Behavior of Fuel Pellets.
R. Yamada, Y. Harayama, A. Ishibashi, and M. Ono. Sep 79, 593p
In Japanese.
U.S. Sales Only.

For the safety assessment of reactor fuel, it is important to grasp local changes of fuel pins due to irradiation in a reactor. Such changes of fuel result mostly from irradiation of fuel pellets. Elasto-plastic analysis programs based on the finite element method were developed to analyze these local changes. In the programs, emphasis is placed on the analysis of cracks in pellets; the interaction between cracked-pellets and cladding is not taken into consideration. The two programs developed are FEMF3 based on a two-dimensional axially symmetric model (r-z system) and FREB4 on a two-dimensional plane model (r-theta system). It is discussed in this report how the occurrence and distribution of cracks depend on heat rate of the fuel pin. (Atomindex citation 11:526141)

LA-UR-80-3365 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Potential Nuclear Safeguards Applications for Neutron Generators.
L. O. Lindquist. 1980, 3p CONF-801111-28
Contract W-7405-ENG-36
Conference on application of accelerators in research and industry, Denton, TX, USA, Nov 1980.

Many nuclear safeguards inspection instruments use neutron sources to interrogate the fissile material (commonly exp 235 U and exp 239 Pu) to be measured. The neutron sources currently used in these instruments are isotopics such as Californium-252, Americium-Lithium, etc. It is becoming increasingly more difficult to transport isotopic sources from one measurement location to another. This represents a significant problem for the International Atomic Energy Agency (IAEA) safeguards inspectors because they must take their safeguards instruments with them to each nuclear installation to make an independent measurement. Purpose of this paper is to review the possibility of replacing isotopic neutron sources now used in IAEA safeguards instruments with electric neutron sources such as deuterium-tritium (D-T, 14-MeV neutrons) or deuterium-deuterium (D-D, 2-MeV neutrons). The potential for neutron generators to interrogate spent-light water reactor fuel assemblies in storage pools is also reviewed. (ERA citation 06:004602)

NUREG/CR-1510 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Contamination Control in Sandia Equation-of-State Experiments,
W. M. Breitung. Jan 81, 109p SAND-80-1277

A cleaning and handling procedure was designed for the equation-of-state measurements on nuclear fuels. Its purpose is to avoid contamination during the experiment preparation that can easily invalidate in-pile vapor pressure measurements. For the design of the preparation route, the following aspects of the contamination phenomenon were investigated: entry points of contamination, required degree of cleanliness, sources and transfer mechanisms for contamination, applicable cleaning techniques and quality control on cleaning and handling procedures.

NUREG/CR-1685-V-1 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Dynamic Analysis to Establish Normal Shock and Vibration of Radioactive Material Shipping Packages. Volume 1.
Quarterly progress rept. 1 Jan-31 Mar 80,
S. R. Fields. Jan 81, 53p HEDL-TME-80-51
See also report for Oct-Dec 79, NUREG/CR-1484.

Equations of motion were derived for equivalent single degree-of-freedom representations of the relative vertical and horizontal motion between a radioactive material shipping package and its rail car (support). These equations will be used to construct CARRS (Cask Rail Car Response Spectra Generator), a model to generate frequency response spectra using calculated results obtained from the CARDS (Cask Rail Car Dynamic Simulator) mode. Results from CARDS are used to show that the rotational components of motion cannot be neglected when generating experimentally-based response spectra. Parameter data on the railway equipment used in the tests conducted at the Savannah River laboratories in July and August of 1978 have been collected to establish the base case for CARDS model validation.

NUREG/CR-1806 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Heavy-Section Steel Technology Program Quarterly Progress Report for July-September 1980,
G. D. Whitman, and R. H. Bryan. Jan 81, 70p
ORNL/NUREG/TM-419
Contract W-7405-eng-26
See also report for Apr-Jun 80, NUREG/CR-1627.

The Heavy-Section Steel Technology (HSST) Program is an engineering research activity devoted to extending and developing the technology for assessing the margin of safety against fracture of the thick-walled steel pressure vessels used in light-water-cooled nuclear power reactors. The program is being carried out in close cooperatin with the nuclear power industry. This report covers HSST work performed in July through September 1980.

NUREG/CR-1871 PC **A02**/MF **A01**
Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM. Inhalation Toxicology Research Inst.
Particle Analysis of Mixed-Oxide Nuclear Fuel Materials by Energy Dispersive X-ray Fluorescence.
Technical rept.,
Arthur F. Eidson, P. B. DeNee, and Catherine A. Macken. Jan 81, 18p LMF-80

Two types of particulate binary mixtures likely to be found in environmental samples have been analyzed by energy dispersive x-ray fluorescence. One was a mixture of two types of particles, and the other was a solid solution within each particle. It was assumed that particles less than 1 micrometer in size were completely irradiated by the electron beam and no self absorption of resulting fluorescent x-rays occurred. Mixed fluorescence was observed and it was determined that analyses of single particles were required for the purpose of estimating the composition of a population of particles from the analysis of a few members of the population. It was concluded that quantitative analysis of particles of mixed elements is practical and that although simplifying assumptions were made, between 20 and 200 particles must be analyzed in order to estimate the composition of the popula-

tion. The number of particles that must be analyzed was shown to be dependent on the desired level of confidence and precision desired. A pure UO2 particle was detected among particles collected from an aerosol of (U,Pu)O2 solid solution particles in agreement with the similar phenomena reported for bulk powders. This result illustrated an advantage of single particle analysis by detecting the same phenomenon in small amounts of respirable size particles.

ORNL/TM-7557 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Consolidated Fuel Reprocessing Program. Progress Report, July 1-September 30, 1980.
W. E. Unger. Dec 80, 48p
Contract W-7405-ENG-26

This progress report is compiled from major contributions from three previous programs: (1) the Advanced Fuel Recycle Program at ORNL; (2) the Converter Fuel Reprocessing Program at Savannah River Laboratory; and (3) the reprocessing components of the HTGR Fuel Recycle Program, primarily at General Atomic and ORNL. The coverage is generally overview in nature. Experimental details and data have been limited. (ERA citation 06:005800)

PATENT-4 218 908
Not available NTIS
Department of Energy, Washington, DC.
Device and Method for Shortening Reactor Process Tubes.
Patent,
W. K. Alexander, C. E. Frantz, and W. E. Lander. Filed 24 Jan 79, patented 26 Aug 80, 6p PAT-APPL-6-005 947
Supersedes PAT-APPL-6-005 947.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This disclosure describes a device and method for in situ shortening of nuclear reactor zirconium alloy process tubes which have grown as a result of radiation exposure. An upsetting technique is utilized which involves inductively heating a short band of a process tube with simultaneous application of an axial load sufficient to cause upsetting with an attendant decrease in length of the process tube. (ERA citation 06:007751)

STUDSVIK/K4-79/28 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Criteria for Reciadding of Spent Light Water Reactor Fuel Before Long Term Pool Storage.
K. Pettersson, and L. Jansson. Jun 79, 25p
U.S. Sales Only.

The question of the need for any special treatment of failed fuel elements prior to long term pool storage has been studied. It is concluded that the main problem appears to be hydride embrittlement of failed fuel rods, which may lead to increased damage during handling and transport of the failed fuel. Some mechanisms for the degradation of failed fuel rods have been identified. They can all be considered as relatively improbable, but further experimental evidence is needed before it can be concluded that the degradation mechanisms are insignificant during pool storage. The report also contains a review of methods for identification of leaking fuel bundles and fuel rods. (Atomindex citation 11:525863)

WAPD-TM-1472 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Thermomechanical Theory of Materials Undergoing Large Elastic and Viscoplastic Deformation (AWBA Development Program).
S. E. Martin, and J. B. Newman. Nov 80, 49p
Contract AC11-76PN00014

A thermomechanical theory of large deformation elastic-inelastic material behavior is developed which is based on a multiplicative decomposition of the strain. Very general assumptions are made for the elastic and inelastic constitutive relations and effects such as thermally-activated creep, fast-neutron-flux-induced creep and growth, annealing, and strain recovery are compatible with the theory. Reduced forms of the constitutive equations are derived by use of the second law of thermodynamics in the form of the Clausius-Duhem inequality. Observer invariant equations are derived by use of an invariance principle which is a generalization of the principle of material frame indifference. (ERA citation 06:006061)

18K. Reactor Physics

INS-TEC-13 PC **A03**/MF **A01**
Tokyo Univ. (Japan). Inst. for Nuclear Study.
Dialogic Process of One Dimensional Nuclear Reaction Data by a Graphic Display.
J. Kokame. 15 May 79, 28p
In Japanese.
U.S. Sales Only.

A program was developed to process nuclear reaction data dialogically with a Graphic Display, FACOM F6234B. Facilities contained are as follows: i) automatic estimation of background, ii) automatic peak search and calculation of the differential cross section, iii) background simulation by the least mean square fit of polynomial through arbitral points, iv) resolution of overlapped peaks assuming Gaussian shape of a peak, v) output of results of the peak search on LP, vi) output of graphic images on XY-plotter. These procedures can be made by function keys and prepared commands through keyboard. One dimensional data less than 1024 channels can be treated at a time. (Atomindex citation 11:526116)

JAERI-M-8310 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Generation of an Actinide Isotopes Cross Section Set for Fast Reactor Calculations Using Data from ENDL and ENDF/B-IV.
T. Mukaiyama, K. Koyama, and H. Kuroi. Jun 79, 124p
In Japanese.
U.S. Sales Only.

A Bondarenko format 25-group cross section set of actinide isotopes was generated for the fuel cycle evaluation and the incineration study in fast reactor systems. Evaluated Nuclear Data Library of Lawrence Livermore Laboratory (U.S.) was used as the source data. The actinide isotopes treated are the following 28: Th-232, U-233, U-234, U-235, U-236, U-237, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Pu-243, Am-241, Am-242, Am-243, Cm-242, Cm-243, Cm-245, Cm-246, Cm-247, Cm-248, Bk-249, Cf-249, Cf-250, Cf-251, Cf-252 and a pseudo-fission product. ENDF/B-IV was used for U-238. The set was then collapsed to one energy group using a large LMFBR core spectrum for the comparison with other one-group sets. (Atomindex citation 11:524510)

JAERI-M-8327 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Measurement of Fast Neutron Spectrum of FCA Assembly with Proton-Recoil Counters.
M. Obu. Jul 79, 55p
In Japanese.
U.S. Sales Only.

Fast neutron spectra were measured at the core centers of FCA Assemblies VI-2 and V-2 by the proton-recoil counter technique. Small cylindrical counters with field tubes of metallized-ceramic type were used. Hydrogen and methane as filling gases were purified to reduce the concentration of electronegative impurities. Gamma-induced background was rejected by the pulse-shape discrimination technique using a digital processing arithmetic unit and a two-dimensional pulse height analyzer. The measured range of spectra was 2.5 keV to 2 MeV. Measurements were made with the energy resolution about 10% (FWHM) or less at energies down to 5 keV. The measured neutron spectra were compared with those calculated by the cell program SP-2000 with fine group cross section library AGLI. Both are in good agreement in the range of 5 keV to 2 MeV except at large iron and oxygen resonances. (Atomindex citation 11:525814)

JINR-E-3-12740 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Selected Topics in Research Program on the IBR-2.
V. I. Luschikov, L. B. Pikelner, Yu. P. Popov, I. M. Frank, and E. I. Sharapov. 1979, 24p
U.S. Sales Only.

The physical parameters of the IBR-2 fast pulsed reactor and research programs carried out on the reactor are described. Design values for instantaneous thermal neutron fluxes are: 10 exp 17 and 10 exp 16 cm exp -2 s exp -1 inside and at the surface of the moderator respectively. In combination with the heavy current, short pulse injector (electron induction accelerator LIU-30 being under construction now) it will become a unique neutron source for the time-of-flight investigations in the energy range from 10 exp -7 to 10 exp 6 eV. The characteristics of the complex IBR-2 + LIU-30 are described. The neutron beams are numbered and their use in the condensed matter and applied research is mentioned. The program for the experiments on the IBR-2 connected with n alpha , n gamma and nf cross section measurements as well as neutron cross section study for few nucleon systems is reported. The prospects for nuclear physics research on the LIU-30 nonmultiplying target facility are outlined using as examples the experiments with polarized neutrons and nuclei and some others. The description is illustrated with the results obtained recently on the IBR-30 operating pulsed reactor. (Atomindex citation 11:524489)

18N. Snap Technology

TES-2865-23 PC **A07**/MF **A01**
Teledyne Energy Systems, Timonium, MD.
Selenide Isotope Generator for the Galileo Mission. Monthly Technical Progress Report.
Oct 78, 130p
Contract AC03-78ET33009

No abstract available.

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A093 481/0 PC **A05**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Propelling Charge Container Leakage Inspection.
Final rept.,
Michael J. Goes. Dec 80, 93p ARLCD-TR-80028, AD-E400 526

A general overview of the parameters associated with propelling charge container leakage inspection is presented. Empirical methods and computer techniques for determining parameter values and equipment settings were developed and verified by laboratory testing. The equipment requirements and setup procedure for an automated LAP line application are outlined, and the effects of manufacturing variations are discussed. The requirements for acceptance standards are addressed, and considerations for additional and future applications are presented.

AD-A093 521/3 PC **A99**/MF **A01**
Department of Defense Explosives Safety Board, Alexandria, VA.

Minutes of the Explosives Safety Seminar (19th) Held at Los Angeles, California, 9-10-11 September 1980. Volume I.
1980, 882p
See also Volume 2, AD-A093 522.

This Seminar is held as a medium by which there may be a free exchange of information regarding explosives safety. With this idea in mind, these minutes are being provided for your information. The presentations made at this Seminar do not imply indorsement of the ideas, accuracy of facts presented, or any product, by either the Department of Defense Explosives Safety Board or the Department of Defense. (Author)

AD-A093 522/1 PC **A99**/MF **A01**
Department of Defense Explosives Safety Board, Alexandria, VA.
Minutes of the Explosives Safety Seminar (19th) Held at Los Angeles, California on 9-10-11 September 1980. Volume II.
Sep 80, 938p
See also Volume 1, AD-A093 521.

Contents: Demilitarization Technology II; Large Scale Simulation and Modeling; Long Range Airblast Propagation; Demilitarization of Chemical Ammunition; Underground Storage; Control of Explosion Effects; Explosives Accidents; Prediction of Explosion Effects on Structures; Navy Explosives Safety Improvement Program I; Legal and Moral Aspects of Safety Requirements; Range Safety and Clearance; Navy Explosives Safety Improvement Program II; Safety Requirements for Ammunition Contracts; Range Safety and Clearance II; Fire Protection in Propellant Manufacturing; Explosives Manufacturing Process Equipment.

AD-A093 648/4 PC **A03**/MF **A01**
Defence Research Establishment Valcartier (Quebec).
A Castable Composite Explosive: The Coefficient of Cubical Expansion,
C. Belanger, F. Bedford, and A. Ouellet. Oct 80, 33p Rept no. DREV-R-4169/80
Abstract in French.

The volume of a composite explosive (RDX/binder-83/17) has been measured at temperatures from 248 to 338 K using Archimedes' principle. The specimens were covered with a protective film specially developed to prevent the binder from dissolving in the fluid, a silicone oil. From the results the coefficient of cubical expansion of the explosive at 296 K is .000357/K as the mean of 15 measurements having a standard deviation of .0000066/K. A similar technique applied to an aluminum specimen whose coefficient is known gave a value about 2.0 percent too large. (Author)

AD-A093 681/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Recovery Characteristics of Exploding Wire Fuses in Air and Vacuum.
Memorandum rept.,
I. M. Vitkovitsky, and V. E. Scherrer. 26 Dec 80, 16p Rept no. NRL-MR-4416

The dielectric strength of exploded wire fuses during the vaporization and after recovery period and the resistivity of the opening fuses are functions of time and depend on the medium surrounding the fuse channel. These parameters determine the efficiency of power flow from the storage system to the load. Specifically, design of experiments using loads with variable impedance, such as imploding plasmas, require detailed information on the fuse characteristics during the time when the load impedance is changing. To provide data that determines the interaction between fuses and variable impedance loads, inductive and recovery electric fields and fuse resistance in air and vacuum were studied. The results show the inductive field amplitude follows the dependence on vaporization time similar to that established for other media and for longer vaporization times. The characteristics of recovery rate of fuses in air and vacuum differ drastically due to the early onset of ionization in fuse channels in vacuum. (Author)

AD-A093 890/2 PC **A04**/MF **A01**
Naval Surface Weapons Center White Oak Lab., Silver Spring, MD.
Theory of Dielectric Breakdown in Reactive Media.
Final rept. Mar-Jun 78,
Michael J. Frankel. 24 Jun 80, 56p Rept no. NSWC/TR-79-331

Theories of dielectric breakdown are examined for application to explosive materials. It is found that breakdown theory in inerts can be used to model and predict breakdown fields in explosives in a low temperature regime. In a higher temperature regime, breakdown theory in explosives must be modified to account for the exothermic kinetics. The relationship between thermal breakdown and thermal explosion theory is discussed and numerical solutions to the heat transport equation are obtained and analyzed. (Author)

AD-A094 019/7 PC **A02**/MF **A01**
Defence Research Establishment Valcartier (Quebec).
Etude D'un Test D'Exsudation Du Trinitrotoluene (Study of an Exudation Test of Trinitrotolvene),
A. M. Bedard, and G. Perrault. Dec 80, 19p
Text in French; summary in English.

No abstract available.

NUREG/CR-1794-V-4 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Summary of Activities and Accomplishments - Final Report: A Proposal to Develop a Method for the Detection of HE Employing Chemiluminescence Reactions.
Progress rept. (Final),
Michael P. Neary. Jan 81, 57p LA-8596-PR
Contract W-7405-eng-36

This is the final and fourth quarter report for the study of high explosive (HE) detection by coupling the chemistry of HE with that of luminol reaction, a well-known chemiluminescence (CL) reaction. The accomplishments include: (1) success in coupling HE and CL chemistry reliably; (2) the capability to use a micellized solvent to concentrate HE; and (3) the basis for design instrumentation that may exhibit better sensitivity and lower levels of detection than that exhibited by the laboratory apparatus used for this study. On the basis of these results the author is prepared to recommend further study.

PB81-148314 PC **A05**/MF **A01**
Science Applications, Inc., Sunnyvale, CA.
An Evaluation of Potential Taggant-Polymer Combinations for Detection Tagging of Blasting Caps.
Final rept.,
M. S. Toy, R. S. Stringham, and S. M. Toy. 12 May 78, 91p SAI-78-508-SV
Sponsored in part by Bureau of Alcohol, Tobacco and Firearms, Washington, DC., and Aerospace Corp., Washington, DC.

The goal of this program is the selection of taggant-polymer combinations that can be incorporated in blasting caps allowing their vapor detection for 5 to 10 years. The background and criteria for the selection of taggants and polymeric matrices are presented. Due to the numerous taggant-polymer pairs to be screened, the parameters for the sorption process of the vapor taggant were limited to the immersion of the polymer substrate in liquid taggant at 95C and a few also at 25C for 24 hours. The emission rates under ambient conditions were measured by gravimetric method and compared with electron capture detection, and the accelerated emission rates at elevated temperatures were determined gravimetrically. The long-range emissions were extrapolated from gravimetric data at three temperatures. The effect of temperature and taggant-polymer combination on the emission processes are summarized.

PB81-148322 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Microencapsulated Vapor Taggants for Predetonation Detection of Explosives.
Final rept.,
Z. Reyes, J. H. Smith, E. McCarthy, and M. Comas. Sep 79, 65p
Sponsored in part by Aerospace Corp., Washington, DC.

SRI International prepared 28 samples of encapsulated fluorocarbon taggants for evaluation as explosives detectors. Several modifications of the REGEMA method of encapsulation were investigated. Five hydrophobic materials and several methods of incorporating these materials into the capsules were investigated as ways to minimize the effects of water vapor on the permeation rates. The characteristics of these capsules are summarized, and the permeation rates given are SRI's best estimate of equilibrium permeation rates. One of the major findings of this study is that a very long time period is needed for the permeation rate of the capsules to reach equilibrium. Also, changes in temperature and/or relative humidity increased permeation rates, which then returned to the previous rate in three to four weeks.

19D. Explosions, Ballistics, and Armor

AD-A093 502/3 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
Impact Dynamics: Theory and Experiment.
Final rept.,
J. A. Zukas. Oct 80, 65p ARBRL-TR-02271, AD-E430 553

A review is presented of the state of the art in the analysis of materials and structures subjected to intense impulsive loading. Emphasis is placed on the penetration and perforation of solids and current developments in three-dimensional finite element and finite difference simulation of impact phenomena. The need for adequate characterization of material response and failure at high strain rates is emphasized and current capabilities highlighted. An assessment is made of anticipated developments and advances in high speed computers, high strain rate materials characterization, and in numerical simulation techniques which will contribute to improved design and reduced vulnerability of materials and structures to impact loading.

AD-A093 503/1 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
The Forward and Adjoint Monte Carlo Estimation of the Kill Probability of a Critical Component Inside an Armored Vehicle by a Burst of Fragments.
Final rept.,
William Beverly. Sep 80, 64p ARBRL-TR-02270, AD-E430 555

Alternate forms of the defining integral which predicts the kill probability of a critical component in a military vehicle by a burst of fragments have been derived. A brief outline of a general Monte Carlo solution of each form is given. The calculational advantages of applying each solution in a ballistic vulnerability methodology are noted. A hypothetical problem is devised and its solution is calculated using each method. The answers to the problem agreed within the calculated standard deviations.

AD-315 125/5 MF **A01**
Aberdeen Proving Ground, MD.
Ballistic Evaluation of Engine Compartment Grilles for Armored Personnel Carrier, M113
J.C. KELTON. Feb 60, 10p Rept no. 11
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

19E. Fire Control and Bombing Systems

AD-A093 718/5 PC **A02**/MF **A01**
Naval Surface Weapons Center, Dahlgron, VA.
Verification and Evaluation System for TRIDENT (VEST): Summary to Management.
Final rept.

W. L. McCoy. May 80, 18p Rept no. NSWC/TR-80-122

The Verification and Evaluation System for TRIDENT (VEST): Summary to Management has been prepared by the Naval Surface Weapons Center (NSWC) for distribution to those persons and activities engaged in software development/production and life-cycle maintenance for the TRIDENT Digital Control Computer (DCC). The VEST is an advanced hardware and software tool which has been developed to aid in software verification and validation (V&V), evaluate total system performance, aid with software debug, and assist with predicting the impact of proposed system modifications. The system produces automated reports and graphs, several types of which are appropriate for viewing by management. This document is intended to communicate to the TRIDENT community the overall capabilities of the system, and its potential worth in life cycle support of the present system and constructing models for future systems. (Author)

AD-060 165/8 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
Aerodynamic Characteristics of Four Models Representing Configurations of the E91 Bomb
R.H. HEALD, and STANLEY BLADOE. Feb 55, 6p Rept no. etf 400 4 1 9
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

19F. Guns

AD-A093 504/9 PC **A02**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Effect of Overstrain in Autofrettage Upon Mechanical Properties of Gun Tubes.
Memorandum rept.,
H. Goodheim, L. Alix, and V. Colangelo. Oct 80, 24p ARLCB-MR-80041, AD-E440 099

A study was undertaken to determine the effect of excessive and normal overstrain on mechanical properties in gun tubes.

AD-A093 505/6 PC **A03**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Numerical Prediction of Residual Stresses in an Overloaded Breech Ring.
Technical rept.,
P. C. T. Chen. Oct 80, 26p ARLCB-TR-80040, AD-E440 100
Presented at the Army Numerical Analysis and Computer Conference, Moffett Field, CA 20-21 Feb 80.

This report describes a numerical technique for predicting the residual stresses in an overloaded breech ring. The numerical approach used is the finite element method based on the incremental stress-strain matrix, for which a computer program is developed. The material behavior is characterized by the von Mises' yield criterion, Prandtl-Reuss flow equations and isotropic hardening rule. A piecewise linear representation for the stress-strain curve is used. The numerical results of the stresses in all elements are obtained for four contact conditions. The location and magnitude of the maximum fillet stress are determined as a function of loading. Residual stresses resulting from elastic unloading are calculated. A satisfactory agreement between numerical and experimental results has been reached.

AD-A093 771/4 PC **A02**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Elastic-Plastic Analysis of Screw Threads.
Technical rept.,
G. P. O'Hara. Nov 80, 22p ARLCB-TR-80043, AD-E440 101
Proceedings of the Conference of Army Mathematicians(26th), 10-12 Jun 80, Cold Regions Research and Engineering Lab, Hanover, NH.

An elastic-plastic analysis method is suggested for screw thread teeth. In this method a single tooth is analyzed using boundary conditions to simulate a long chain of identical teeth. A set of five different loads are suggested to simulate pressure and shear on each flank along with a general stress field in the component. An example is worked out for a British Standard Buttress thread form. Data is presented from the example to show that friction is a very important parameter.

AD-A093 985/0 PC **A04**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
The M198 Howitzer as a Direct Support Weapon during Amphibious Operations.
Master's thesis,
Leslie M. Palm. 6 Jun 80, 52p AD-E750 054

This study attempts to determine the impact of the M198 howitzer's mobility on its ability to perform as a direct support weapon during amphibious operations. The focus of this analysis is on the weapon's amphibious adaptability, ground mobility and helicopter transportability as compared to the howitzer it is replacing. The study indicates that the M198 suffers a relative loss of mobility in two critical areas. It requires a greater effort to be transported in the landing craft currently available and it requires an auxiliary mover for positioning in the absence of its prime mover. The most significant of these deficiencies is the degraded ground mobility. The development of an auxiliary propulsion unit which is an integral part of the howitzer will tremendously improve its maneuverability. (Author)

19G. Rockets

AD-A093 768/0 MF **A01**
Tennessee Univ. Space Inst., Tullahoma.
Development of a Method for Predicting Trajectories and Terminal Velocities of Backblast Debris from Small Rockets.
Final rept. May 79-Aug 80,
Rush E. Elkins, and Dennis R. Keefer. Dec 80, 82p ARO-16711.1-A-E
Contracts DAAG29-79-C-0098, DAAG29-79-C-0127
Availability: Microfiche copies only.

A semiempirical model is developed to predict debris hazard arising from the backblast of small rockets. The model is in three parts: Gas dynamics give upper bounds on maximum velocities of jet entrained particles. Aerodynamics give an expression for subsequent motion of debris through still air. A semiempirical study gives an expression describing skin penetration by debris. Computer codes are given for implementation of model. (Author)

20. PHYSICS

20A. Acoustics

AD-A093 455/4 PC **A03**/MF **A01**
Cambridge Acoustical Associates, Inc., MA.
High Frequency Asymptotics and the Transition Matrix Formulation of Scattering,
Joel M. Garrelick. Feb 80, 31p Rept no. CAA-U-659-260
Contract N00014-78-C-0218

This report deals with the use of high frequency asymptotics to evaluate and possibly facilitate, the convergence of the transition matrix formulation of scattering. For illustrative purposes, elastic and acoustic scattering from spherical and spheroidal cavities is considered in some detail. References are presented for other types of inclusions. Finally, a general method is suggested for integrating high frequency asymptotic solutions into the T-matrix formulation itself with the purpose of improving convergence. The method is implemented for the case of a spherical, and a prolate spheroidal, cavity.

AD-A093 461/2 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Noise Measurements and the dB.
Technical memo.,
K. R. Maslen. Jul 80, 28p RAE-TM-FS-348, DRIC-BR-75369

This Memorandum presents the author's opinion that the conventional use of the dB in studies of acoustic noise can obscure and complicate simple relationships and lead to the possibility of error because of misunderstandings of the nature of logarithms and because the order of the numbers involved is concealed by the compressed scale. Examples of errors and inaccuracies are given, and some cases where consideration of noise in terms of rms pressure would be simpler, or would lead to better understanding of the processes involved, are discussed. It is suggested that, although the dB may be a convenient unit for many purposes, more emphasis on the physical nature of noise would help in the interpretation of phenomena and prevent some of the confusions that arise, especially in dealing with the general public. (Author)

AD-A093 473/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
Properties for Inverse Analysis of Sound Propagation in Simple Oceanic Waveguides,
Carl Wunsch. 19 Jun 79, 22p
Contract N00014-75-C-0291
Pub. in Jnl. of Marine Research, v38 n3 p413-433 1980.

No abstract available.

AD-A093 519/7 Not available NTIS
Utah Univ., Salt Lake City.
Explicit Inversion of the Helmholtz Equation for Ultra-Sound Insonification and Spherical Detection,
James Ball, Steven A. Johnson, and Frank Stenger. 1965, 13p ARO-14864.6-M
Grants DAAG29-77-G-0139, PHS-CA-234-30
Sponsored in part by Grant PHS-HL-006-87.
Availability: Pub. in Acoustical Imaging. Volume 9. Visualization and Characterization, p451-461 n.d. (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 665/8 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Theoretical Aspects of Sound Transmission in Sediments.
Journal article,
Robert D. Stoll. 12 Feb 80, 11p Rept no. LDGO-2994
Contracts N00014-80-C-0098, N00014-75-C-0210
Pub. in Jnl. of Acoustical Society of America, v68 n5 p1341-1350 Nov 80.

No abstract available.

AD-A093 948/8 PC **A06**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
NOISECHECK Procedures for Measuring Noise Exposure from Aircraft Operations.
Final rept.,
Dwight E. Bishop, Andrew S. Harris, Joan Mahoney, and Peter E. Rentz. Nov 80, 107p BBN-3869, AFAMRL-TR-80-45
Contract F33615-77-C-0514
See also Rept. no. AMRL-TR-78-125, AD-A088 033.

NOISECHECK is a measurement program used (1) when an engineer is uncertain about a Sound Ex-

posure Level (SEL) resulting from a particular type of operation or (2) to check noise contours determined by NOISEMAP - an Air Force computer program. The file of aircraft noise data used by NOISEMAP is called NOISEFILE. The NOISECHECK measurement program uses portable noise monitors that measure Day-Night Sound Levels (DNLs) over one or more days as well as individual Sound Exposure Levels (SELs). The measured DNLs are then compared with the DNLs calculated by NOISEMAP, or they contribute SEL data for comparison with NOISEFILE. This report delineates the field test data acquisition and analysis procedures used to conduct NOISECHECK type measurement studies. A companion report, AMRL-TR-78-125, Development of NOISECHECK Technology for Measuring Aircraft Noise Exposure, describes the instrumentation development and subsequent field test conducted at Barksdale AFB as part of this research effort. (Author)

AD-337 912/0 PC **A02**/MF **A01**
Bureau of Ships, Washington, DC.
Acoustic Pressure Signals in Water (Sofar)
3 Sep 57, 16p DASA-WT909
In cooperation with Office of Naval Research.
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The objectives of Project 1.5 were to make special observations at several USTEF stations (Underwater Sound Transmission Experimental Facilities) in the Pacific and at a similar research station in the Atlantic for the purpose of adding to knowledge of underwater sound propagation and investigating the possibility of determining yields. Records obtained at these stations during the critical periods following the Castle shots were analyzed. (Author)

N81-15819/8 PC **A02**/MF **A01**
Institut Franco-Allemand de Recherches, Saint Louis (France).
Application of Optical Methods to the Study of Jet Noise and Turbulence Application des Methodes Optiques, en Particulier a l'Etude de la Turbulence et du Bruit des Jets.
P. G. Sava, and J. Haertig. 1 Aug 80, 16p ISL-CO-201/80
Text in French. Presented at Journees sur les Methodes Optiques a la Mecanique des Fluides, Orsay, France, 26-27 Nov. 1979.

Optical methods are generally applied in fluid mechaics for either visualization or measurement. The use of a laser anemometer to study flow velocity in a jet and its relaton to the sound radiated is described. The same acoustic emission phenomenon is also measued by combining the signals from four Schlieren systems with that from an interferometer. The use of an optical Fourier transformation approach with real time analysis to determine the spatio-temporal structure of a field of mass volume such as a waveguide or free jet is also examined.

PAT-APPL-6-174 292 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Electronically Simulated Rotating Prism for Ultrasonic Beam Scanning.
Patent Application,
Bertram A. Auld. Filed 1 Aug 80, 14p AD-D008 072/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and apparatus are described for electronically scanning a spherically focused beam in a c-scan mode using a spiral path rather than a traditional raster scan pattern. Essential to the technique is an electronically simulated rotating ultrasonic prism. The technique allows use of a single delay line with simple connections and no requirements of multiple mixing. (Author)

PATENT-4 196 423
Not available NTIS
Department of Energy, Washington, DC.
Acoustic Emission Intrusion Detector.
Patent,
D. W. Carver, and J. W. Whittaker. Filed 9 Aug 78, patented 1 Apr 80, 6p PAT-APPL-932 150 Supersedes PAT-APPL-932 150-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An intrusion detector is provided for detecting a forcible entry into a secured structure while minimizing false alarms. The detector uses a piezoelectric crystal transducer to sense acoustic emissions. The transducer output is amplified by a selectable gain amplifier to control the sensitivity. The rectified output of the amplifier is applied to a Schmitt trigger circuit having a preselected threshold level to provide amplitude discrimination. Timing circuitry is provided which is activated by successive pulses from the Schmitt trigger which lie within a selected time frame for frequency discrimination. Detected signals having proper amplitude and frequency trigger an alarm within the first complete cycle time of a detected acoustical disturbance signal. (ERA citation 06:005167)

20B. Crystallography

AD-A093 451/3 PC **A06**/MF **A01**
Virginia Univ., Charlottesville. Dept. of Materials Science.
Dislocation Concepts in Friction and Wear.
Technical rept.,
Doris Kuhlmann-Wilsdorf. Dec 80, 122p
Contract N00014-76-C-1009

Using dislocation concepts, primarily as relevant to geometrical considerations, and other basic facts concerning plastic properties of crystalline materials, a number of qualitative and quantitative relationships in the area of friction and wear are developed.

AD-A093 555/1 Not available NTIS
State Univ. of New York at Albany. Inst. for the Study of Defects in Solids.
Semi-Empirical Calculations of the Configuration and Electronic Structure of Lithium-Related Defects in Silicon,
Vijay A. Singh, Christoph Weigel, and James W. Corbett. 7 Feb 80, 8p
Contract N00014-C-75-C-0919, Grant NSF-DMR75-18104
Availability: Pub. in Physica Status Solidi (b), v100 p533-539 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

N81-15872/7 PC **A03**/MF **A01**
Alabama Univ. in Huntsville. Dept. of Physics.
A Study of Crystal Growth by Solution Technique.
Final rept.,
R. B. Lal. Jan 81, 35p NASA-CR-3370, M-318
Grant NSG-8033

The mechanism of crystal growth by solution technique was studied. A low temperature solution crystal growth setup was developed. Crystals of triglycine sulfate (TGS) were grown using this arrangement. Some additional tasks were performed toward fabrication of experiments for future space flight.

N81-150302 PC **A03**/MF **A01**
Crystal Systems, Inc., Salem, MA.
Growth of Ruby Crystals by the Heat Exchanger Method, Phase I - NSF Small Business Innovation Research.
Final rept. 1 Oct 79-31 Mar 80,
Frederick Schmid, and Chandra P. Khattak. 31 Mar 80, 38p NSF/RA-800308
Grant NSF-DAR79-17180

Conditions for the growth of large, uniformly doped laser crystals by the Heat Exchanger Method are explored. This development enhances laser applications which heretofore have been limited by the availability of suitable quality and/or size of materials. This study involved determination of the melt point, selection of crucible material and establishment of furnace operating parameters. The melt point of ruby was found to be 2040 plus or minus 10 C. Molybdenum crucibles can be used to contain ruby in vacuum as well as under argon atmospheres at desired superheat temperatures over extended periods required for crystal growth. Volatilization of chromium oxides at superheat temperatures proved to be the major problem. Thermodynamic analysis was conducted and vapor pressures of volatile species calculated. Experimentally, volatilization of chromium oxides was suppressed by using welded covers on crucibles and operating under an argon pressure in the furnace.

20D. Fluid Mechanics

AD-A093 528/8 PC **A02**/MF **A01**
University of Southern California, Los Angeles. School of Engineering.
Large Coherent Structures in an Impinging Jet,
Chih-Ming Ho, N. S. Nosseir, J. S. Bradbury, F. Durst, and B. E. Launder. 1979, 11p AFOSR-TR-80-1362
Contract F49620-78-C-0060
Pub. in Proceedings of the International Symposium on Turbulent Shear Flows, p296-304, 2-4 Jul 79.

No abstract available.

AD-A093 544/5 Not available NTIS
University of Southern California, Los Angeles. Dept. of Aerospace Engineering.
Longitudinal Vortices in a Transitioning Boundary Layer,
J. B. Anders, and R. F. Blackwelder. 1980, 12p ARO-13681.5-E
Grant DAAG29-76-G-0297
Availability: Pub. in Laminar-Turbulent Transition, p110-119 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 671/6 PC **A02**/MF **A01**
Grumman Aircraft Engineering Corp., Bethpage, NY. Research Dept.
Computations of the Oblique Impingement of Inviscid, Rotational Round Jets Upon a Plane Wall,
A. Rubel. 1980, 11p Rept no. RE-611J
Contract N00014-77-C-0524
Presented at the AIAA Fluid & Plasma Dynamics Conference (13th), 14-16 Jul 80, Snowmass, CO.
Availability: American Inst. of Aeronautics and Astronautics, 1290 Avenue of the Americas, New York, NY 10019 (No Copies furnished by DTIC/NTIS).

An inviscid, rotational flow model for incompressible jet impingement is formulated in terms of vector and scalar potentials and the vector vorticity. The set of four elliptic partial differential equations governing the kinematics of the flow and three coupled hyperbolic equations for the vorticity are solved numerically for the impingement of fully developed round jets upon a plane wall at incidence angles of 90 (normal), 75 and 60 deg. The finite-difference computations are consistent with both existing rotational stagnation point analysis and reported data on stagnation point location, wall pressure and, to a lesser extent, azimuthal distribution of momentum efflux. (Author)

AD-A093 736/7 PC **A03**/MF **A01**
Scientific Research Associates, Inc., Glastonbury, CT.
Computation of Laminar and Turbulent Flow in Curved Ducts, Channels and Pipes Using the Navier-Stokes Equations.
Final rept. 1 Oct 79-30 Sep 80,
R. C. Buggeln, W. R. Briley, and H. McDonald. Dec 80, 42p Rept no. SRA-R80-920006-F
Contract N00014-79-C-0713

Both laminar and turbulent flows in strongly curved ducts, channels, and pipes are studied by numerical methods. The study concentrates on the curved square-duct geometry and flow conditions for which detailed measurements have been obtained recently by Taylor, Whitelaw, and Yianneskis. The solution methodology encompasses solution of the compressible ensemble-averaged

Navier-Stokes equations at low Mach number using a split linearized block implicit (LBI) scheme, and rapid convergence on the order of 80 noniterative time steps is obtained. The treatment of turbulent flows includes resolution of the viscous sublayer region. A series of solutions for both laminar and turbulent flow and for both two- and three-dimensional geometries of the same curvature are presented. The accuracy of these solutions is explored by mesh refinement and by comparison with experiment. In summary, good qualitative and reasonable quantitative agreement between solution and experiment is obtained. Collectively, this sequence of results serves to clarify the physical structure of these flows and hence how grid selection procedures might be adjusted to improve the numerical accuracy and experimental agreement. For a three-dimensional flow of considerable complexity, the relatively good agreement with experiment obtained for the turbulent flow case despite a coarse grid must be regarded as encouraging. (Author)

AD-A093 742/5 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Modifications to MacCormack's 2-D Navier-Stokes Compression Ramp Code for Application to Flows with Axes of Symmetry and Wall Mass Transfer.
Final rept. Jan 79-Mar 80,
Richard G. Hindman. Jan 81, 57p Rept no. AEDC-TR-80-24
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A computer code for solving the two-dimensional compressible Navier-Stokes equations governing the supersonic/hypersonic flow over a compression ramp as developed by MacCormack was extended to apply to axisymmetric flows over cylinder-flare shapes. Two new operators were developed for this extension, one of which was found to produce an upper stability bound on the step size. This bound is proportional to the Prandtl number and inversely proportional to the ratio of thermal capacities of the fluid times the maximum value over all grid points of the kinematic viscosity scaled by the radial coordinate value. Additionally, the computer code was modified to allow for the option of wall mass transfer. This required reformulation of the hyperbolic fine mesh operator because of an assumption in the development of the original operator that the wall-normal velocity in the fine mesh is much less than the sound speed. Numerical results are presented for a particular hollow cylinder-flare configuration, and comparisons are made with the experimental data of Roshko and Thomke and with the results of a boundary-layer code attributable to Patankar and Spalding. (Author)

AD-A094 011/4 PC **A12**/MF **A01**
Stanford Univ., CA. Thermosciences Div.
The Thermal And Hydrodynamic Behavior of Thick, Rough-Wall, Turbulent Boundary Layers,
P. M. Ligrani, R. J. Moffat, and W. M. Kays. Aug 79, 251p Rept no. HMT-29
Contracts N00014-67-A-0112-0072, N00014-76-C-0532

Thick, fully rough, and transitionally rough turbulent boundary layers were studied in order to investigate the differences between fully rough and transitionally rough behavior and to observe how downstream development affects these flows as the boundary layers become very thick. Measurements included Stanton numbers, skin friction coefficients, mean temperature and velocity profiles, Reynolds stress tensor component profiles, and spectra of the longitudinal velocity fluctuations. Predictions of wall heat transfer, wall shear, and mean profiles were made using a mixing-length and turbulent Prandtl number closure scheme which accounted for the effects of wall roughness in the boundary layer equations. The turbulent layers were artificially thickened using an array of solid obstacles which produced a two-dimensional equilibrium flow field with properties representative of natural bounday layers, at least up to the level of the turbulent correlations on a smooth wall, and to the level of the spectra of longitudinal velocity fluctuations on a rough wall. A rough-wall boundary layer environment was provided in which all measurements of lower order than the turbulence correlations could be discussed regarding the influence of roughness, and considered to have properties representative of natural behavior. (Author)

AD-357 969/5 PC **A06**/MF **A01**
Naval Ordnance Lab., White Oak, MD.
Drag Loading on Model Targets
J. Petes, and L. Slifer. 14 Dec 64, 124p AEC-WT1306
Report on Operation Redwing Proj. 1.6.
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

Measurements of drag forces on model targets were made during Operation Redwing in the spring of 1956. From the force measurements and measurements of the free-stream parameters of side-on and dynamic pressures, drag coefficients were obtained for each of the model configurations under each of the test conditions. Reasonable drag-coefficient correlation was obtained for all of the test models (except spheres) for the field and wind tunnel data. Hence, it was concluded that, for the model sizes used, the field flow conditions approached the steady-state flow conditions of the wind tunnel. The short-duration flow in the shock tube and the flow blockage resulting from the model size obviated the establishment of steady drag conditions in this facility. Thus, only extrapolations can be made to wind-tunnel and field conditions. (Author)

AD-477 200/0 PC **A03**/MF **A01**
David Taylor Model Basin, Washington, DC. Aerodynamics Lab.
Wind-Tunnel Tests to Determine the Air-Flow Characteristics in the Wakes of Three Aircraft Carrier Models Part I - Tests of the Attack Carrier CVA 65,
Herbert E. White. May 59, 49p Rept nos. DTMB-Aero-955-Pt-1, DTMB-C-1051
See also Part 2, AD-477 201.
Distribution limitation now removed.

Wind-tunnel tests of a 1/144-scale model of the CVA 65 aircraft carrier were conducted to determine the local dynamic pressures in that portion of the air wake of the carrier normally traversed by an airplane approaching for a landing. The wake surveys were conducted with a pitot-static rake, for winds directly over the bow of the ship, and at yaw angles of 10 and 20 deg. Plots are presented showing the local dynamic pressure as a fraction of the free-stream dynamic pressure. One plot presents the dynamic pressure ratios encountered by an airplane flying a typical approach. The effect of the island of this carrier is somewhat larger and more pronounced than it is on a carrier with a conventional island. Sharp differences in the dynamic pressure patterns are seen between yaw angles of 10 and 20 deg. (Author)

AD-477 202/6 PC **A02**/MF **A01**
David Taylor Model Basin, Washington, DC. Aerodynamics Lab.
Wind-Tunnel Tests to Determine the Air-Flow Characteristics in the Wakes of Three Aircraft Carrier Models. Part III - Tests of the Attack Carrier CVA 64,
Herbert E. White. Jun 59, 19p Rept nos. DTMB-Aero-955-Pt-3, DTMB-C-1074
See also Part 2, AD-477 201.
Distribution limitation now removed.

Wind-tunnel test of a 1/144-scale model CVA 64 carrier were conducted to determine the distribution of dynamic pressure in the area traversed by landing aircraft. The local dynamic pressures in the air wake were surveyed at three carrier angles of yaw: 0, 10, and 20 deg. Results are presented as ratios of local dynamic pressure to free-stream dynamic pressure at various locations in the wake. In addition, a plot is presented showing the dynamic pressures encountered by an airplane approaching on a 4 deg glide path at one set of conditions of wind-over-deck and airplane airspeed. From a dynamic pressure distribution standpoint, a ship yaw angle of zero is the most desirable. (Author)

AD-802 157/8 PC **A04**/MF **A01**
Ballistic Research Labs., Aberdeen Proving Ground, MD.
Body Nose Shapes for Obtaining High Static Stability.
Memorandum rept.,
A. S. Platou. Feb 52, 53p Rept no. BRL-MR-592
Distribution limitation now removed.

Wind tunnel tests at Ma = 1.7 have been run on various projectile nose shapes as part of a program to develop a short length 105mm spin stabilized shaped charge projectile. For satisfactory flight it is required that the projectile have a center of pressure much further aft than is required on a conventional shell. This is due to the rearward C.G. position of the shaped charge and to the small amount of spin which can be used without seriously decreasing the effectiveness of a shaped charge. The nose configurations chosen for test were those generating a minimum amount of lift, but still maintaining the required standoff distance for the shaped charge. Most of the configurations which accomplished this purpose have the conventional ogive replaced by a spike which produces a region of separated flow between the tip of the spike and the front of the main body. The results show that rearward center of pressure positions can be obtained by using these special configurations, however, the drag is higher than for a forward center of pressure configuration. With these configurations (which are 3.5 to 4 cal. long) it is possible to obtain centers of pressure which are up to 76% of the length aft of the nose compared to 48% of the length obtained with a cone cylinder of the same length. (Author)

AD-846 491/9 PC **A03**/MF **A01**
Ac Electronics-Defense Research Labs Santa Barbara Calif Aerospace Operations Dept
Mechanical Characteristics of Fluid-Ejecting Models.
Technical rept.,
Jerar Andon. Sep 68, 28p AC-DRL-TR68-47, SAMSO-TR-68-420
Contract F04694-67-C-0007, DAAG43-67-C-0009
Distribution limitation now removed.

Models that eject compressible fluid into the wake during a hypervelocity flight were developed. The squirt mechanism allows various amounts of gas to be ejected as well as different modes of ejection. Both conical and spherical shaped models were used. A short interior ballistics analysis of the model in a hypervelocity gun is given. The valve dynamics, stress computation and flight stability considerations are included. (Author)

AD-846 492/7 PC **A09**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Hardening Technology Studies - III. SHAPE-II Code - Shock Hydrodynamic and Plastic Elastic (A Series of FORTRAN IV and SLEUTH Codes).
Technical rept.,
N. B. Brooks, and R. L. Lansdale. 31 Jan 68, 192p LMSD-N-16-68-1, SAMSO-TR-68-69
Contract F04694-67-C-0020
Prepared in cooperation with Shock Hydrodynamics, Inc., Sherman Oaks, Calif. See also AD-835 068L.
Distribution limitation now removed.

This report describes the SHAPE-II (Shock Hydrodynamic and Plastic Elastic) computer code - a two-dimensional numerical technique that can be used for detailed analysis of impulsive loading problems. The program consists of two separate codes, EPIC (Extended Particle In Cell) and SHEP (Shock Hydrodynamic Elastic Plastic), joined by an overlay transformation. Either of the two codes can also be used separately. The SHAPE-II Code is a series of FORTRAN IV and SLEUTH Codes programmed for the UNIVAC 1108 computer. The mathematical formulations upon which the program is based, applicability and limitations, computational processes, variables, and transformations are discussed in this report. Two sample demonstration problems are also included with a program listing. (Author)

AD-848 843/9 PC **A03**/MF **A01**
TRW Systems Group, Redondo Beach, CA.
Transformation Theory for the Compressible Turbulent Boundary Layer with Arbitrary Pressure Gradient.
Technical rept.,

John E. Lewis, Toshi Kubota, and Wilmot H. Webb. Sep 68, 48p 09601-6036-T0-00, SAMSO-TR-68-439
Contract F04701-68-C-0041, Grant ARPA Order-888
Distribution limitation now removed.

Coles' analytical development of the transformation has been reviewed and its application to the constant pressure turbulent boundary layer studied. The limitations of the theory noted by Baronti and Libby are clarified, and an attempt is made to explain the remaining discrepancies. The equations governing the scaling functions (which link the high speed boundary layer to an equivalent low speed flow) are derived in terms of the integral properties of the low speed flow for an arbitrary pressure distribution. The modeling is completed by coupling the pressure gradients of the two flows and predicting the behavior of the integral properties of the low speed flow. The resulting formulation predicts the integral properties of the high speed turbulent boundary layer as well as the required modeling to an equivalent low speed flow. Finally, the theory is applied to a variety of situations. (Author)

LA-UR-80-3022 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Metric Universal Properties of Period Doubling Bifurcations and the Spectrum for a Route to Turbulence.
M. J. Feigenbaum. 1979, 14p CONF-791256-1
Contract W-7405-ENG-36
New York Academy of Sciences meeting, New York, NY, USA, Dec 1979.

The ideas of the metric universal properties of maps on an interval are formally developed and then used to determine some universal aspects of a route to turbulence. (ERA citation 06:006775)

NUREG/CR-1491 PC **A04**/MF **A01**
Argonne National Lab., IL.
Local Volume-Time Averaged Equations of Motion for Dispersed, Turbulent, Multiphase Flows,
William T. Sha, and John C. Slattery. Nov 80, 62p ANL-80-51

In most flows of liquids and their vapors, the phases are dispersed randomly in both space and time. These dispersed flows can be described only statistically or in terms of averages. Local volume-time averaging is used here to derive a self-consistent set of equations governing momentum and energy transfer in dispersed, turbulent, multiphase flows. The empiricisms required for use with these equations are the subject of current research.

N81-15236/5 PC **A04**/MF **A01**
Arizona State Univ., Tempe.
Jet Array Impingement with Crossflow-Correlation of Streamwise Resolved Flow and Heat Transfer Distributions.
Final rept.,
L. W. Florschuetz, D. E. Metzger, and C. R. Truman. Jan 81, 60p NASA-CR-3373, ERC-R-80024
Grant NSG-3075

Correlations for heat transfer coefficients for jets of circular offices and impinging on a surface parallel to the jet orifice plate are presented. The air, following impingement, is constrained to exit in a single direction along the channel formed by the jet orifice plate and the heat transfer (impingement) surface. The downstream jets are subjected to a crossflow originating from the upstream jets. Impingement surface heat transfer coefficients resolved to one streamwise jet orifice spacing, averaged across the channel span, are correlated with the associated individual spanwise orifice row jet and crossflow velocities, and with the geometric parameters.

N81-15238/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Viscous Compressible Flow About Blunt Bodies Using a Numerically Generated Orthogonal Coordinate System.
R. A. Graves, and H. H. Hamilton, II. Jul 80, 38p NASA-TM-81859

A numerical solution to the Navier-Stokes equations was obtained for blunt axisymmetric entry bodies of arbitrary shape in supersonic flow. These equations are solved on a finite difference mesh obtained from a simple numerical technique which generates orthogonal coordinates between arbitrary boundaries. The governing equations are solved in time dependent form using Stetter's improved stability three step predictor corrector method. For the present application, the metric coefficients were obtained numerically using fourth order accurate, finite difference relations and proved to be totally reliable for the highly stretched mesh used to resolve the thin viscous boundary layer. Solutions are obtained for a range of blunt body nose shapes including concavities.

N81-15242/3 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
An Experimental Study of the Effects of Swirl and Density Difference on Mixing in Shear Flow.
C. S. Tan. Nov 80, 76p NASA-CR-163851, GT/PDL-153
Grant NSG-3187

Experiments were carried out on the mixing of streams with and without swirl and with and without density differences in a coannular geometry. Three variations of flow visualization techniques were used: direct excitation, collisional excitation, and quenching of the tracer. The axial variation of the flow for the case with swirl in the inner annulus is investigated in some detail. From the flow visualization pictures, it is concluded that the initial Helmholtz instability of the tangential shear layer gives rise to small scale peripheral strucutres, then it is possible that the inner swirling stream drives an instability which turns these small scale peripheral structures into ones of larger scale, thereby rearranging the initial vorticity distribution of the flow field. The pictures also indicate the occurrence of interchange of fluid between the annuli. It is also concluded that the interaction of density field with the resulting radial pressure gradient may have influenced the evolution of the flow structures.

N81-15244/9 PC **A17**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Unsteady One Dimensional Flows in Complex Networks and Pressurized Vessels.
1980, 387p UKI-LS-1980-1
Lecture Held at Rhode-Saint-Genese, Belgium, 14-18 Jan. 1980.

No abstract available.

N81-15288/6 PC **A22**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Mathematical Methods in Fluid Mechanics.
1980, 519p VKI-LS-1980-4
Lecture Held at Rhode-Saint-Genese, Belgium, 25-29 Feb. 1980.

No abstract available.

N81-15305/6 PC **A17**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Computational Fluid Dynamics, Volume 1.
1980, 377p VKI-LS-1980-V-L-1
Lecture Held in Rhode-Saint-Genese, Belgium, 24-28 Mar. 1980.

No abstract available.

N81-15310/8 PC **A17**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Computational Fluid Dynamics, Volume 2.
1980, 380p VKI-LS-1980-5-V-2
Lecture Held in Rhode-Saint-Genese, Belgium, 24-28 Mar. 1980.

No abstract available.

N81-15315/7 PC **A13**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Thermo-Hydrodynamic Instability: Theory and Applications.
1980, 279p VKI-LS-1980-7
Lecture Held in Rhode-Saint-Genese, Belgium, 5-9 May 1980.

No abstract available.

20E. Masers and Lasers

AD-A093 489/3 PC **A02**/MF **A01**
Heriot-Watt Univ., Edinburgh (Scotland). Dept. of Physics.
Submillimeter Laser and Fabry-Perot Spectroscopy Using Metallic Mesh.
Annual technical rept. no. 1, 1 Jun 78-31 May 79, C. R. Pidgeon, and B. W. Davis. May 79, 20p
Grant DA-ERO-78-G-074

The performance of an optically pumped submillimeter laser is directly dependent on the infrared (CO2) pump used, and the importance of the pump laser in relation to the tuning and stability characteristics has necessitated extensive investigations being carried out on the pump laser. This CO2 laser would later be used in conjunction with the submillimeter laser at present being completed. (Author)

AD-A093 507/2 PC **A02**/MF **A01**
Heriot-Watt Univ., Edinburgh (Scotland). Dept. of Physics.
Submillimeter Laser and Fabry-Perot Spectroscopy Using Metallic Mesh.
Annual technical rept. no. 2, 1 Jun 79-31 May 80, C. R. Pidgeon, and B. W. Davis. May 80, 14p
Grant DA-ERO-78-G-074

An optically pumped submillimeter laser has been designed and the laser resonator constructed. The objective was to produce a laser which could accommodate a wide range of waveguides and output coupling forms, yet still retain consistent performance over the whole range from 40 micrometers to 1.2 mm. The performance expected was a large number of emission lines over the described range with output powers in excess of 1 mW. Experience from other submillimeter laser systems used led to the choice of a 25 mm I/D dielectric waveguide with a 5 mm diameter pinhole type output coupler as the basis of the optical resonator. A novel mirror translator system, in the form of a 'wobble stick', has been designed and successfully operated in the laser. Such power levels as described were ahcieved using the CO2 pump laser described in the 1st Annual Technical Report. A two element Low Pass Blocking Filter which was designed and constructed for use in conjunction with the submillimeter laser has been successfully applied to help identify the 170.6 micrometers emission line from CH3OH pumped with 9P36 CO2 transition. The more powerful 118.8 micrometer emission line was effectively blocked, although still lasing, since the filter was external to the laser cavity.

AD-A093 540/3 PC **A13**/MF **A01**
BDM Corp., Albuquerque, NM.
Chemical Laser Computer Code Survey,
Carl M. Wiggins, Dennis N. Mansell, Peter B. Ulrich, and John L. Walsh. 1 Dec 80, 281p NRL-8450
Contract N00173-79-C-0109

A survey of modeling capability for predicting chemical laser performance has been carried out. Optics, kinetics and gasdynamics codes are included in the survey. Seventy-eight separate codes developed at thirteen research centers are covered in this report. Both quick-look summaries and more in-depth summary sheets have been prepared for each code. A supplementary narrative section provides introductory material concerning code features and capabilities as well as explanation of terminology used on the survey forms. This document is intended as a comparison of code features and as an introduction to capabilities of individual codes.

N81-15349/6 PC **A07**/MF **A01**
Aerospace Corp., Los Angeles, CA. Electronics Research Lab.
Repetitively Q-Switched Nd:BeL Lasers.
Final rept., 1 Feb. - 30 Apr. 1979.

J. Degnan, M. Birnbaum, and L. G. Deshazer. 2 May 79, 148p NASA-CR-160073
Contract NAS5-25098

The thermal and mechanical characteristics which will ultimately limit the performance of Nd:BeL at high average power levels were investigated. The output beam characteristics (pulse width, peak power, beam dimensions and collimation) were determined at high repetition rates for both Nd:BeL and Nd:YAG. The output of Nd:BeL was shown to exceed that of Nd:YAG by a factor of 2.7 at low Q-switched repetition rates (1 Hz). This result follows from the smaller stimulated emission cross section of x-axis Nb:BeL compared to that of NdYAG by the same factor. At high repetition rates (10 Hz) the output of Nd:Bel falls to a level of three-fifths of its low repetition rate value while under similar tests the output of Nd:YAG remains essentially constant. A comparison of the measured values of the elasto-optic coefficients, the dn/dT values and the linear expansion coefficients for BeL and YAG failed to provide an explanation for the performance of BeL; however, thermal lensing was observed in Nd:BeL. Results imply that the output of a high repetition rate Q-switched Nd:BeL laser (high thermal loading) could be dramatically increased by utilization of a resonator design to compensate for the thermal lensing effects.

PATENT-4 189 686
Not available NTIS
Department of Energy, Washington, DC.
Combination Free Electron and Gaseous Laser.
Patent,
C. A. Brau, S. D. Rockwood, and W. E. Stein.
Filed 27 Sep 77, patented 19 Feb 80, 8p PAT-APPL-837 250
Supersedes PAT-APPL-837 250-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A multiple laser is presented having one or more gaseous laser stages and one or more free electron stages. Each of the free electron laser stages is sequentially pumped by a microwave linear accelerator. Subsequently, the electron beam is directed through a gaseous laser, in the preferred embodiment, and in an alternative embodiment, through a microwave accelerator to lower the energy level of the electron beam to pump one or more gaseous lasers. The combination laser provides high pulse repetition frequencies, on the order of 1 kHz or greater, high power capability, high efficiency, and tunability in the synchronous production of multiple beams of coherent optical radiation. (ERA citation 06:006388)

PATENT-4 191 928
Not available NTIS
Department of Energy, Washington, DC.
Laser System Using Regenerative Amplifier.
Patent,
J. L. Emmett. Filed 11 Jan 78, patented 4 Mar 80, 14p PAT-APPL-868 644
Supersedes PAT-APPL-868 644-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A high energy laser system is presented using a regenerative amplifier, which relaxes all constraints on laser components other than the intrinsic damage level of matter, so as to enable use of available laser system components. This can be accomplished by use of segmented components, spatial filters, at least one amplifier using solid state or gaseous media, and separated reflector members providing a long round trip time through the regenerative cavity, thereby allowing slower switching and adequate time to clear the spatial filters, etc. The laser system simplifies component requirements and reduces component cost while providing high energy output. (ERA citation 06:006387)

PB81-143257 Not available NTIS
National Bureau of Standards, Washington, DC.
Piezo-Optic Coefficients of Four Neodymium-Doped Laser Glasses,
R. M. Waxler, and A. Feldman. Aug 80, 12p
Sponsored in part by California Univ., Livermore. Lawrence Livermore Lab.
Pub. in Applied Optics 19, n15 p2481 Aug 80.

The results of measurements of the piezo-optic coefficients of four new laser glasses, one neodymium-doped phosphate glass and three neodymium-doped fluorophosphate glasses, are reported. The measurements were made at 0.6328 micrometers and 1.15 micrometers and, in general, the values are slightly smaller at the longer wavelength. The small values of the coefficients at both wavelengths for certain glasses indicate that these glasses are to be preferred for laser use.

UCID-18868 PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
Gain Saturation in Nd:Doped Laser Materials.
W. E. Martin, and D. Milam. 24 Sep 80, 124p
Contract W-7405-ENG-48

Gain saturation measurements on neodymium-doped laser materials is reported. Measurements at pulse durations of 1.0, 9.0, and 50 ns, and at 1064 nm and 1053 nm, were made on silicate, phosphate, and fluorophosphate glasses, and two crystalline materials, YAG and YLF. The measurement technique, calibrations, experimental cross-checks, and errors are described in detail. The philosophy behind each aspect of the measurements are discussed, schematic diagrams of the experiment are shown, and supporting data is provided. (ERA citation 06:006380)

UCRL-53077 PC **A07**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Conceptual Design of a 1.5-MJ, 2-Hz KrF Fusion Laser System.
J. Caird, W. O. Allen, and H. G. Hipkin. Dec 80, 142p
Contract W-7405-ENG-48

The report consists of two major elements: Section II presents an overview of the design study and discusses the major results and conclusions derived from this study; and Section III provides details of the technical analyses and results and presents technical summaries that discuss e-beam pulsed-power conditioning, optical-system design, mechanical-systems design, facilities, overall laser-system efficiency, and capital costs. (ERA citation 06:006381)

20F. Optics

AD-A093 546/0 Not available NTIS
City Coll., New York. Dept. of Physics.
Two-Photon Double-Beam Optical Bistability,
G. P. Agrawal, and C. Flytzanis. 26 Dec 79, 5p ARO-16629.1-P
Contract DAAG29-81-K-0005
Availability: Pub. in Physical Review Letters, v44 n16 p1058-1061, 21 Apr 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 688/0 PC **A05**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Tunable Optical Sources.
Final rept. 1 Sep 79-31 Aug 80,
Robert L. Byer. Nov 80, 84p GL-3209, ARO-15278.11-P
Contract DAAG29-79-C-0181

We have successfully completed the study, development and application of a computer controlled Nd:YAG pumped LiNbO3 tunable source. The device has operated reliably for more than one year. It tunes over a 1.4 - 4.0 micron range and operates at resolutions to less than 0.08 per cm at 10 mJ output at 10 pps. We have invented and demonstrated a new optical device, the radial birefringent element. We have invented and demonstrated a computer controlled laser attenuator. During the past year we have developed the theory for a slab configuration laser source. We have successfully demonstrated the slab geometry as applied to Nd:Glass. Work is continuing on the understanding and implementation of this high energy, high repetitional rate Nd:Glass slab laser source. (Author)

AD-A093 920/7 Not available NTIS
City Coll., New York. Dept. of Physics.
Steady-State Formulation of Optical Bistability for a Doppler-Broadened Medium in a Fabry-Perot,
H. J. Carmichael, and G. P. Agrawal. 12 Mar 80, 9p TR-3, ARO-16629.3-P
Contract DAAG29-81-K-0005
Availability: Pub. in Optics Communications, v34 n2 p293-299 Aug 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-846 765/6 PC **A03**/MF **A01**
Ac Electronics-Defense Research Labs Santa Barbara Calif Aerospace Operations Dept
Analysis of Errors in the Reduction of Interferometric Data.
Technical rept.,
David K. Sangster, and Gerald A. Shaw. Oct 68, 30p AC-DRL-TR68-59, SAMSO-TR-68-437
Contract F04694-67-C-0007, DAAG43-67-C-0009
Distribution limitation now removed.

Typical interferometric data of axisymmetric wakes of free-flight models is reduced. Data reduction techniques, including shock discontinuities, analysis of measurement errors, and data smoothing are described and applied to a computer program. (Author)

LA-UR-80-3429 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Multiple-Shot Laser Damage Thresholds of Ultraviolet Reflectors at 248 and 308 Nanometers.
S. R. Foltyn, and B. E. Newnam. 1980, 15p
CONF-8009119-1
Contract W-7405-ENG-36
12. annual symposium on optical materials for high power lasers, Boulder, CO, USA, Sep 1980.

Multiple-shot damage thresholds of dielectric reflectors have been measured at 248 and 308 nm. Standard irradiation conditions were a 10-ns pulsewidth, 0.6-mm spot diameter and 35-Hz pulse repetition frequency. The reflectors, from various sources, were composed of oxide and fluoride films. Although damage was generally initiated at visible film defects, there was no correlation between damage susceptibility and the appearance of these defects. At levels near threshold, damage was most often observed as an increase in white-light scatter of a site with no growth upon continued irradiation; at higher levels, the damage site grew with successive shots. Test sites were subjected to at least 10 exp 3 shots and some sites received as many as 2.5 x 10 exp 4 shots; however, with only one exception damage was found to occur within the first few shots or not at all. Reflectors at 248 nm typically had damage thresholds in the 1.0 to 1.8 J/cm exp 2 range with two samples exhibiting unexpectedly high thresholds of 2.8 and 3.0 J/cm exp 2 . In some cases, a subthreshold pre-irradiation treatment resulted in a 20 to 25% enhancement in damage resistance. (ERA citation 06:006794)

N81-15037/7 PC **A03**/MF **A01**
Institut Franco-Allemand de Recherches, Saint Louis (France).
Introduction to Interferometry Introduction a l'Interferometrie.
G. Smeets. 25 May 79, 29p ISL-CO-207/79
Text in French. Presented at Tech. Univ. Karlsruhe Reunion de Travail en Opt., Karlsruhe, West Germany, 10 May 1979.

All optical interferometers (interferometers with two beams) function according to the same fundamental principle: rays of incident light are separated into two partial coherent beams which follow different paths in the interferometer and are recombined after their departure. At the point where the two beams come together, they interfere. An interferometric measurement consists of the registration (photographic or otherwise), of the power of the radiation and can include (1) the geometric field; (2) the index of refraction of what is called the phase object; and (3) the wavelength of the light,

and consequently the small variations due to a Doppler effect. The Wollaston prism is described and the operations of a laser differential interferometer, a laser interferential microphone, and a laser interferometric spectrometer are described.

N81-15351/2 PC **A03**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Laser Activity. Doubling of Optical Frequency in Crystals: Analysis of Parameters Activite Laser. Doublage de Frequence Optique dans les Cristaux: Etude des Parametres.
G. Melkonian. 16 Apr 80, 59p REPT-124-PRT/AMP
In French; English Summary.

The influence of wavelength, phase-matching angle, and temperature is analyzed for four possible cases of frequency doubling in crystals. This theoretical study seeks to determine the orders of magnitude required to predict the mechanical stability of the increase, the finesse of control in temperature, and the dynamics in operating mechanism loops. The theoretical prediction must be compared with experimental values, especially when the output exceeds 20%. Moreover, there is a dispersion in the optical performance of one crystal from another.

N81-15352/0 PC **A03**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Laser Activity. Present Capabilities for Generating a Lidar Optical Frequency by Means of a Nd-YAG Laser Activite Laser. Possibilities Offertes pour Generer Une Frequence Optique Lidar a l'Aide d'UN Laser Nd-YAG.
G. Melkonian. 7 Aug 80, 45p REPT-237-PRT/AMP
In French: English Summary.

The choices arise from the possible utilization from the fundamental wave, of the Nd-Yag Laser, or its harmonics with dyes and crystals. Crystals such as KDP and ADP were used for second harmonic generation or sum frequency generation. A crystallographic solution was calculated for type I and type II phase matching process with temperatures between each crystal Curie point and 393 K. The principal Lidar missions were studied: atmospheric density, aerosols, temperature, O3, OH, ClO, NO2, SO2, H2O, Na, K, Mg, Mg(+), and MgO.

N81-15353/8 PC **A02**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Laser Activity. Doubling of Type I Optical Frequency in KDP and ADP Crystals in the 500-1200 NM Range. Study of Constraints in Function of Efficiency Activite Laser. Doublage de Frequence Optique de Type I dans les Cristaux de KDP et d'ADP dans la Gamme 500-1200 NM Etude des Contraintes en Fonction du Rendement.
G. Melkonian. 18 Aug 80, 13p REPT-239-PRT/AMP
In French; English Summary.

The relative variation of the output energy in a type 1 second harmonic generation process by an angle variation or a spectral linewidth variation is given for KDP and ADP crystals from any wavelength between 500 and 1200 nm.

N81-15354/6 PC **A02**/MF **A01**
Institut Franco-Allemand de Recherches, Saint Louis (France).
Laser Beam Reflection on a Variable Index Medium Reflexion d'UN Faisceau Laser sur UN Milieu a Indice Variable.
H. Royer, and J. J. Arnoux. 2 Jan 80, 25p ISL-R-101/80
Text in French.

A variable index medium is considered as being composed of an infinity of elementary layers behaving as a sheet with parallel fronts. The propagation of a coherent luminous beam normal to the front can be calculated only by considering the multiple reflections between each front. The general expression for the transmittance of the medium is provided under the form of an infinite series. In the particular case of a medium whose index varies linearly between two very closely related values, a simple expression for the coefficient of reflection is given. This model can be used to evaluate the reflection of a laser beam on a shock wave produced in a transparent medium.

PAT-APPL-6-066 107 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Laser Pulse Detector.
Patent Application,
D. N. Mashburn, and M. A. Akerman. Filed 13 Aug 79, 8p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A laser pulse detector is provided which is small and inexpensive and has the capability of detecting laser light of any wavelength with fast response (less than 5 nanoseconds rise time). The laser beam is focused onto the receiving end of a graphite rod coaxially mounted within a close-fitting conductive, open-end cylindrical housing so that ablation and electric field breakdown of the resulting plasma occurs due to a bias potential applied between the graphite rod and housing. The pulse produced by the breakdown is transmitted through a matched impedance coaxial cable to a recording device. The cable is connected with its central lead to the graphite rod and its outer conductor to the housing. (ERA citation 06:006389)

PAT-APPL-6-210 188 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Multiple Thin Film Absorption of Reflected Substrate Modes in Waveguide System.
Patent Application,
Arnold H. Singer, and Ronald T. Holm. Filed 25 Nov 80, 15p AD-D008 068/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This application deals with the reduction of light reflections in substrate modes. The use of absorbing multilayer thin-film light interference coatings on the backside of a LiNbO3 substrate provides an optical system which substantially reduces reflected substrate modes in integrated optical spectrum analyzers at around 8300 A wavelength, or at other selected wavelengths, over a broad range of incident angles by selection of individual film thickness and optical constants.

PATENT-4 194 170
Not available NTIS
Department of Energy, Washington, DC.
Shifting of Infrared Radiation Using Rotational Raman Resonances in Diatomic Molecular Gases.
Patent,
N. A. Kurnit. Filed 13 Nov 78, patented 18 Mar 80, 6p PAT-APPL-960 409
Supersedes PAT-APPL-960 409-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device is presented for shifting the frequency of infrared radiation from a CO sub 2 laser by stimulated Raman scattering in either H sub 2 or D sub 2 . The device of the preferred embodiment comprises an H sub 2 Raman laser having dichroic mirrors which are reflective for 116 mu m radiation and transmittive for 10 mu m, disposed at opposite ends of an interaction cell. The interaction cell contains a diatomic molecular gas, e.g., H sub 2 , D sub 2 , T sub 2 , HD, HT, DT and a capillary waveguide disposed within the cell. A liquid nitrogen jacket is provided around the capillary waveguide for the purpose of cooling. In another embodiment the input CO sub 2 radiation is circularly polarized using a Fresnel rhomb lambda/4 plate and applied to an interaction cell of much longer length for single pass operation. (ERA citation 06:006385)

20G. Particle Accelerators

IFVE-OEF-79-114 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Data Processing System at the "Lepton" Installation.
R. I. Dzhelyadin, A. M. Zaitsev, V. P. Kubarovskii, V. A. Mukhin, and V. F. Obraztsov. 1979, 18p SERP-E-134
In Russian.
U.S. Sales Only.

The software system to process experiments on the study of inclusive production of muon pairs performed at the "Lepton" installation is described. All stages of experiment processing, from the primary processing of "raw" tapes up to graphic presentation of processing results, are considered in detail. The basic principles and algorithms applied during design of the system are given. Application of the software system during the processing of the series of experiments in the off line regime at the ICL-1906 computer has shown its high efficiency. In addition this system as a basis easily and quickly adapts to specific physical problems under solution. (Atomindex citation 11:526135)

INS-TH-120 PC **A02**/MF **A01**
Tokyo Univ. (Japan). Inst. for Nuclear Study.
Cryogenic System for Liquid Hydrogen Polarimeter.
T. Kitami, M. Chiba, H. Hirabayashi, T. Ishii, and S. Kato. 20 Apr 79, 13p
U.S. Sales Only.

A cryogenic system has been constructed for a liquid hydrogen polarimeter in order to measure polarization of high energy proton at the 1.3 GeV electron synchrotron of Institute for Nuclear Study, University of Tokyo. The system principally consists of a cryogenerator with a cryogenic transfer line, a liquid hydrogen cryostat, and a 14.5 l target container of thin aluminum alloy where liquid hydrogen is served for the experiment. The refrigeration capacity is about 54 W at 20.4 K without a target container. (Atomindex citation 11:525758)

LPC-79-18 PC **A02**/MF **A01**
College de France, Paris. Lab. de Physique Corpusculaire.
Dalitz-Yennie Type Equivalent-Photon Spectrum for gamma gamma Collisions in Electron Storage Rings.
C. Carimalo, P. Kessler, and J. Parisi. Aug 79, 10p
U.S. Sales Only.

It is shown that the original Dalitz-Yennie version of the equivalent-photon approximation, established for electroproduction in the target rest frame, is not Lorentz-invariant and therefore cannot be applied to gamma gamma collisions in electron storage rings. For those processes, a new Dalitz-Yennie type formula for the equivalent-photon spectrum is given, the use of which is however restricted to single-tagging measurements (assuming the electrons to be tagged at finite angles). As is shown, numerical differences between the original and the new formula may be significant in practical applications. (Atomindex citation 11:525738)

RL-79-077 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Integral and Differential Methods for the Numerical Solution of 2-D Field Problems in High Energy Physics Magnets and Electrical Machines.
A. Y. Hannalla, J. Simkin, and C. W. Trowbridge. Oct 79, 25p
U.S. Sales Only.

Numerical calculations of electromagnetic fields have been performed by solving integral or differential equations. Integral methods are ideally suited to open boundary problems and on the other hand the geometric complexity of electrical machines makes differential methods more attractive. In this paper both integral and differential equation methods are reviewed, and the limita-

tions of the methods are highlighted, in an attempt to show how to select the best method for a particular problem. (Atomindex citation 11:525752)

SLAC-PUB-2567 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Tunnel Radio Communications System at Stanford Linear Accelerator Center.
W. C. Struven. Jul 80, 4p CONF-801164-1
Contract AC03-76SF00515
Telecommunications conference, Houston, TX, USA, 30 Nov 1980.

A unique single frequency, dual daisy chain tunnel radio communication system has been developed for use in our new Positron-Electron Storage Ring. Communications are possible between portables in the underground ring and between a portable in the ring and all control rooms on the site. The system is designed as a wide band facility and therefore can carry many simplex and duplex transmissions. This system utilizes TV twinlead as a distributed antenna and repeater amplifiers to cover more than 7000 feet of underground tunnel. The design philosophy, tests and initial design are discussed and contrasted with the final implementation of the system. Future uses of the system are discussed. (ERA citation 06:006426)

SLAC-PUB-2631 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Numerical Design of Electron Guns and Space Charge Limited Transport Systems.
W. B. Herrmannsfeldt. Oct 80, 21p CONF-800952-3
Contract AC03-76SF00515
International conference on charged particle optics, Giessen, F.R. Germany, 8 Sep 1980.

This paper describes the capabilities and limitations of computer programs used to design electron guns and similarly space-charge limited transport systems. Examples of computer generated plots from several different types of gun problems are included. (ERA citation 06:005211)

20H. Particle Physics

AD-338 026/8 PC **A04**/MF **A01**
Cook Research Labs Morton Grove Ill
Thermal Effects on B-47B Aircraft in Flight
C.W. Luchsinger. Apr 57, 72p AEC-WT926
Report on Operation Castle.
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The objective of the project was to determine experimentally the effects of the detonation of high-yield nuclear weapons upon the structure of a B-47B type aircraft positioned to receive the predicted maximum allowable radiant exposure. To realize this objective, the aircraft was instrumented in a manner that would judiciously measure these effects and enable comparison with data gathered in previous weapon effects tests, notably Operation c0vy. (Author)

AD-338 330/4 PC **A03**/MF **A01**
Defense Atomic Support Agency, Washington, DC.
Gamma Rate Versus Time
Peter Brown, and Gerald Carp. May 54, 34p
DASA-WT913
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

Initial- andual-gamma rates were measured as a function of time at various distances from high-yield thermonuclear detonations. Initial gamma rate versus time was measured at fixed distances from ground zero. In particular, meas urements were made of the effect on initial-gamma rate caused by the passage of the shock front from ground zero through the detector station. Residual-gamma rate versus time was measured to provide gamma-radiation time-intensity data, which give information both on fallout rate of arrival and gamma-field-decay rate during the 36-hour period after the detonation. Scintilla tion detectors were used in making measurements. The instrument stations were self-contained-the only outside facilities required were timing signals to turn on the stations at a predeter mined time prior to the detonation. Data obtained indicate that the expanding fireball and the pas sage of the shock front from ground zero through the detector station had a marked effect on the initial-gamma rate-hence on the integrated ex posure. The initial-gamma rate reached its first peak immediately after the detonation, decreased slowly, began to rise slowly, and then increased rapidly to a second peak (which was about the same value as the first peak). After reaching the second-peak value, the initial-gamma rate de creased rapidly to zero. (Author)

AD-357 965/3 PC **A03**/MF **A01**
Army Chemical Corps Engineering Command, Army Chemical Center, MD.
Decontamination and Protection
J. C. Maloney, and M. A. Schmoke. Apr 57, 26p
AEC-WT-1312
Report on Operation Redwing, Project 2.4 (U).
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

The objectives of Project 2.4 were to investigate the contamination characteristics of construction materials exposed at various angles and orientations to contamination resulting from high-yieldnuclear detonations and to investigate the effectiveness of various decontamination techniques, in order to obtain data on the radiological recovery of military installations. Panels of various construction materials were mounted on board the YAG-39 and YAG-40, which were operated through regions of fallout after Shots Cherokee, Zuni, Flathead, Navajo, and Tewa. With the exception of Shot Tewa, the fallout contamination deposited on the YAGs from all these events was insignificant with respect to fulfilling the objectives of this project. The contaminated Shot Tewa panels were, unfortunately, exposed to heavy rainfall prior to receipt for study. Apparently, the rains effectively decontaminated the panels. The most heavily contaminated surface, an asphalt and gravel built-up roofing panel, read approximately 500 mr/hr when received from Shot Zuni at H+60 hours. Other panels were generally much less contaminated. Some gave readings barely above island background. (Author)

CEA-CONF-4742 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
(E,E'p) Reaction.
J. Mougey. 1979, 19p CONF-790847-25
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.
U.S. Sales Only.

Quasi-free scattering (e,e'p) experiments on light and medium nuclei performed at the Saclay 600 MeV Linear Accelerator are described. Interpretation of the measured spectral function in terms of single hole state momentum and energy distributions is discussed. A marked discrepancy with an energy weighted sum rule indicates the deviations from independant particle shell model and the need for a better theoretical description of the reaction. (Atomindex citation 11:524505)

CEA-CONF-4743 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Radial Distribution of the 1F/sub 1/2/ Neutron Orbit.
S. K. Platchkov, J. B. Bellicard, and J. M. Cavedon. 1979, 4p CONF-790847-27
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.
U.S. Sales Only.

We have measured cross sections for elastic scattering of electrons by the exp 49 Ti magnetization distribution. This experiment has been performed at the Saclay 600 MeV linear accelerator. The exp 49 Ti cross sections were measured at backward angle=155 exp 0 for 9 incident energies between 175 MeV and 325 MeV. The charge scattering contribution was measured at 500 MeV and subtracted. The energy resolution (delta E/E=5.10 exp -4) was sufficient to resolve the elastic peak from the lowest excited state. The smaller cross section measured was 2x10 exp -37 cm exp 2 /sr. Background was absent. The results have been interpreted in terms of radial distribution of the valence neutron. (Atomindex citation 11:524527)

CEA-CONF-4790 PC **A02**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Fission Neutron Spectrum Measurements for Fast Neutron Induced Fission.
J. Frehaut, A. Bertin, and R. Bois. 1979, 3p
CONF-790602-95
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.
U.S. Sales Only.

We developed a method based on the time-of-flight technique and using both a fission chamber and a pulsed incident neutron beam. The fission neutron spectra have been measured for exp 235 U at incident neutron energies of 0.6 and 7 MeV, and for exp 238 U at 7 MeV. (Atomindex citation 11:524412)

CEA-CONF-4837 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Pion Photoproduction.
J. M. Laget. 1979, 21p CONF-790847-24
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.
U.S. Sales Only.

A special emphasis is put on the pion photoproduction reactions induced in the few-body systems in the delta -resonance energy range. The multiple scattering series has been summed explicitly and relevant experiments have been carried out to study the corresponding singularities. A possible description of the N delta interaction is presented. The extensions to the threshold region, as well as to the heavier nuclei, are also presented. (Atomindex citation 11:524479)

CEGB-RD/B/N-4632 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Computer Code for Calculating Neutron Cross-Sections from Resonance Parameter Data.
A. J. Mill. Aug 79, 35p
U.S. Sales Only.

A computer code, XSEC, has been written which calculates neutron cross-sections from resonance data. Although the program was originally written in order to identify neutron 'windows' in enriched nuclides, it may be used to evaluate the total neutron cross-section of any medium mass nuclide at intermediate energies. XSEC has proved very useful in identifying suitable nuclides for use as neutron filters at intermediate energies. (Atomindex citation 11:524500)

CENBG-7808 PC **A05**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Search of Deuterons at Rest in p+ exp 9 Be Implies alpha +D+ alpha and alpha + exp 6 Li Implies alpha +D+ alpha Reactions. Analysis of Coulomb Dissociation of Intermediate Structure.
These (3e Cycle),
M. Caussanel. 1978, 86p
In French.
U.S. Sales Only.

The aim of this work was the search of a chained alpha -d- alpha structure in exp 10 B nucleus obtained by the reactions alpha + exp 6 Li at 7.4 MeV and p+ exp 9 Be between 2.5 and 3.2 MeV. The experimental signature is the emission of deuterons at rest in center of mass system. Such events are recognized by detecting in coincidence the two alphas emitted in the dissociation. An identification technique with gaseous detectors was used. The experimental results (population zones in Dalitz plot) have been interpreted by calculation of the Coulomb trajectories of the three fragments and emphasized the active role of the initial structure. (Atomindex citation 11:524379)

CENBG-7917 PC **A02**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.

Energy Spectra and Complete Angular Distributions of Different Light Particles Emitted in the exp 236 U Tripartition Induced by Thermal Neutrons.
F. Caitucoli, B. Leroux, P. Perrin, G. Barreau, and M. Asghar. 1979, 2p CONF-790507-10
In French.IAEA symposium on physics and chemistry of fission, Julich, F.R. Germany, 14 May 1979.
U.S. Sales Only.

No abstract available.

CRN-PN-79-16 PC **A03**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Levels in exp 45 K and exp 46 K Excited by the beta Decay of exp 45 Ar and exp 46 Ar.
A. Huck, G. Klotz, A. Knipper, C. Miehe, and G. Walter. 1979, 27p
U.S. Sales Only.

The nuclides exp 45 Ar and exp 46 Ar have been produced by spallation reactions on vanadium targets at E/sub p/ = 600 MeV. The subsequent decays to exp 45 K and exp 46 K states have been studied. An intensity of 98.6+-0.6% was measured for the beta transition of the 1.94MeV state in exp 46 K. A decay scheme involving 13 beta branches has been established for exp 45 Ar, and the corresponding log values have been deduced. Eleven states are reported for the first time in the decay scheme of exp 45 Ar 1.42, 1.47, 1.72, 2.52, 2.57, 2.75, 3.31, 3.99, 4.04, 4.36 and 4.57MeV. From the lifetime, tau=4.6+-0.6ns, deduced from gamma - gamma delayed coincidences, the angular momentum of the 1081keV level has been established as (7/2) exp - on the basis of the transition strength of its gamma decay. A survey on the 1f/sub 7/2/ implies 1d/sub 3/2/M2 transition in odd K nuclei is presented and the observed hindrance factors are discussed. (Atomindex citation 11:524454)

ECN-79 PC **A05**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Radiative Capture of Polarized Neutrons in exp 51 V and exp 141 Pr Nuclei.
Proefschrift (Dr.),
J. B. M. de Haas. 17 Dec 79, 77p
U.S. Sales Only.

The author presents experimental data on the capture of polarized thermal neutrons by exp 51 V and exp 141 Pr. (Atomindex citation 11:524432)

FEI-896 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Fine Structure in the Fission Fragment Yields.
V. V. Malinovskii. 1979, 36p
In Russian.
U.S. Sales Only.

The most interesting experiments on the fine structure of fission product yields of U, Pu, Th, Cf, Es, Cm, Fr, Np isotopes are discussed. Modern comprehension of the fine structure nature in connection with other problems of fission dynamics is considered. It is noted that the fine structure results from pairing correlations in a nucleus. The conclusion is drawn that the available set of experimental data is not sufficient to elucidate the fine structure nature. (Atomindex citation 11:524492)

IPNO-PhN-79-17 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Are Giant Resonances Observed in Deep Inelastic Reactions.
N. Frascaria, P. Colombani, A. Gamp, J. P. Garron, and M. Riou. 1979, 14p
U.S. Sales Only.

Evidence is presented for the observation of four structures in the incompletely relaxed part of the energy spectra of fragments emitted in the deep inelastic exp 40 Ca + exp 40 Ca reaction at 400 MeV. These structures appear to be produced in a direct process and to be consistent with the excitation of giant resonance. (Atomindex citation 11:524411)

IPNO-T-79-04 PC **A06**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Study of Neutron Hole States in exp 207 exp 206 exp 205 Pb with the (Exp 3 He, alpha) Reaction at 110MeV. First Tests in (D,T) Reaction of the Orsay Synchrocyclotron Spectrometric Line.
These (3e Cycle),
J. Guillot. 1979, 117p
In French.
U.S. Sales Only.

Neutron hole states in the exp 207 Pb, exp 206 Pb, exp 205 Pb isotopes were studied up to 25 MeV excitation energy using the (exp 3 He, alpha) reaction at 100MeV incident energy, with 100 keV energy resolution. Angular distributions for the low-lying levels and inner hole states have been analyzed with DWBA and spectroscopic factors extracted for 1 > 3 levels. Missing strengths for the first levels from 1i13/2 and 1h9/2 orbits are found in the bump located around 5MeV excitation energy. The fragmented bump observed around 8MeV excitation energy is attributed to 1h11/2 pick-up with 45% of the sum-rule limit. Finally, the structure extending up to 21 MeV excitation energy is attributed to 1g7/2+1g9/2 pick-up with 80% of the total strength. In exp 207 Pb, the four first isobaric analog states Tsub(>) = 45/2 are identified around 20 MeV excitation energy. The second part of this work presents the first tests in (d,t) reaction at 108 MeV on exp 90 Zr and exp 208 Pb using the achromatic line of the Orsay synchrocyclotron. (Atomindex citation 11:524430)

ISN-78-42 PC **A06**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
Heavy Ion Identification, Complete Fusion Reaction exp 20 Ne + exp 12 C at 110 MeV.
These (D. es S.),
J. J. Lucas. 1979, 109p
In French.
U.S. Sales Only.

Various means of complete evaporation residues identification (E, Z, A) are compared. The experimental set up described uses ' delta E, magnetic rigidity, time of flight' method. Predictions of performances are confirmed. Isotopic distributions of evaporation residues in the exp 20 Ne + exp 12 C reaction plus energy and angular distributions are in good agreement with compound nucleus statistical model predictions. Ionic charge distributions of the residues between 1.5 MeV/a.m.u and 4 MeV/ a.m.u are satisfactorily reproduced by a semi-empirical formula. (Atomindex citation 11:524485)

JAERI-M-8342 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Evaluation of Neutron Nuclear Data for exp 242 Cm.
S. Igarasi, and T. Nakagawa. Jul 79, 34p
In Japanese.
U.S. Sales Only.

Evaluation of neutron nuclear data for exp 242 Cm is performed in the energy range of thermal to 20 MeV. Quantities evaluated are total, elastic and inelastic scattering, fission, capture, (n,2n) and (n,3n) reaction cross sections, resonance parameters, nu -bar, mu /sub l/-bar, and angular distributions of emitted neutrons. Resonance parameters are recommended below 275 eV. Statistical and optical model calculations are made above 275 eV. The optical potential parameters used in the calculations are obtained by using the experimental total cross section of exp 241 Am. Fission cross section is obtained from systematics and the evaluated data of exp 244 Cm. The results are compiled in the ENDF/B format. (Atomindex citation 11:524459)

JINR-R-1-12388 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Average Number of Neutrons in the pi exp - p, pi exp - N and pi exp -12 C Collisions at 40 GeV/ C.
V. G. Grishin, Z. Korbel, Z. Trka, and Ya. Trkova. 1979, 9p
In Russian.
U.S. Sales Only.

The average number of secondary neutrons has been obtained in (pi exp - p), (pi exp - n) and (pi exp -12 C)-interactions at 40 GeV/c by means of studying secondary neutral stars induced by neutrons in a propane bubble chamber. They are turned out to be equal to 0.37+-0.05, 0.64+0.11; and 0.54+-0.05. The following values of coefficients of charge exchange were obtained: a(p implies n)=0.37+-0.05 and alpha (n implies p)=0.36+-0.06. The coefficients of inelasticity for neutrons have also been estimated: 0.05, 0.07 and 0.07 for the pi exp - p, pi exp - n and pi exp -12 C - collisions. (Atomindex citation 11:524426)

JINR-R-1-12527 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Experiments on the Search for Superdense Nuclei.
K. Ya. Gromov, V. A. Karnaukhov, V. D. Kuznetsov, T. Nad, and S. A. Novikov. 1979, 15p
In Russian.
U.S. Sales Only.

The search for beta-active superdense nuclei among the products of the interaction of 8 GeV protons and deuterons with tantalum and tungsten targets are described. The mass-separation off-line with scanning of the beta-activity distribution on the focal plane was used. According to the pion-condensation theory, the long-lived abnormal nuclei are expected to be more neutron-deficient than the usual ones. Moreover, their mass numbers may be significantly noninterger, measured in the normal mass scale, because of unusual binding energy. These predictions were used in the present search. Abnormal nuclei have not been detected. The upper limits for their yield are the following: 1) for potassium in the range of 34 <= A <= 41 - 7x10 exp -5 in respect to the yield of exp 42 K; 2) for rubidium in the range of 73 <= A <= 79 - 3x10 exp -4 in the case of beta exp + - decay and 4x10 exp -5 (beta exp -) in respect to the yield of exp 81 Rb; 3) for cesium in the range of 113 <= A <= 123 4x10 exp -5 in respect to the yield of exp 128 Ba; upper limit for barium is twice as large as for cesium. These estimations were made under assumption that the half life for superdense nuclei is equal to 5 h. (Atomindex citation 11:524427)

JINR-R-3-12562 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Study on the (N, gamma F) Process on exp 235 U Nucleus.
Z. Dlougy, A. Duka-Zoiomi, I. Krishtiak, and Ts. Panteleev. 1979, 22p
In Russian.
U.S. Sales Only.

The fluctuations of uranium X-rays yield in coincidence with fission of exp 235 U nucleus were observed at several neutron resonances. The results show the dependence of K/sub alpha 1/ yield on fission width GITA/sub f/. This dependence is explained by (n, gamma f) process on the exp 235 U nucleus. The mean width (GITA/sub gamma f/) was determined to be equal to (2.1/sub -1.7//sup +1.5/) MeV. The mean energy of continuus gamma - rays emitted before the fission was found to be (750/sub -130//sup +400/) keV. It seems that the gamma - transitions taking place before fission are mostly of the magnetic dipole type. (Atomindex citation 11:524394)

JINR-R-7-12839 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Investigation of alpha-Particle Emission in the exp 22 Ne+ exp 197 Au Reaction.
Eh. Gerlik, A. M. Kalinin, R. Kalpakchieva, Yu. Ts. Oganesyan, and Yu. Eh. Penionzhkevich. 1979, 12p
In Russian.
U.S. Sales Only.

Experimental data on measuring energy spectra, production cross sections and particle angular distributions in coincidence with fission fragments produced in the Ne+ exp 197 Au (178 MeV) reaction are presented. It is shown that in this reaction alpha particles are produced whose energy spectrum at high energies differs strongly from that of evaporational alpha -particle spectrum, and angular distribution is strongly forward peaked. It follows from the data obtained that more than a half of alpha -particles are due to residual nucleus fis-

sion fragments. The results evidence the fast mechanism of production of alpha -particles coinciding with fission fragments. (Atomindex citation 11:524416)

LPC-79-17 PC **A02**/MF **A01**
College de France, Paris. Lab. de Physique Corpusculaire.
Interpretation of Single-Tagged Events in gamma gamma Experiments.
C. Carimalo, P. Kessler, and J. Parisi. Aug 79, 15p
U.S. Sales Only.

In the framework of the helicity formalism, it is shown that single-tagged events in gamma gamma experiments performed with electron storage rings involving finite-angle tagging systems may be analysed, with a very good accuracy, as electroproduction on a free photon target, i.e. through a four- or six-term formula. (Atomindex citation 11:525739)

LYCEN-7922 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Third Particle in Deep Inelastic Collisions.
R. Billerey, C. Cerruti, A. Chevarier, N. Chevarier, and B. Cheynis. Apr 79, 20p
U.S. Sales Only.

Measurements of charged particles-fragment or fragment-fragment angular correlations resulting from the reaction exp 14 N + exp 27 Al at 70 and 100 MeV laboratory energies have been done. Light particle evaporation from the heavy recoil for the more relaxed fragments is shown to be the main process. However, a prompt alpha emission from the contact zone results in a correlation with all channels. (Atomindex citation 11:524357)

LYCEN-7927 PC **A09**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Differential Cross Section Measurements of the pi exp - p Elastic Scattering in the Coulomb Interference Region Between 30 and 140 GeV.
These (D. es S.),
B. Ille. 1979, 176p
In French.
U.S. Sales Only.

The differential cross section of elastic pi exp - -p scattering in the Coulomb interference region from 30 GeV to 140 GeV has been measured at the CERN SPS using in conjunction an ionization chamber recoil spectrometer and a forward multiwire proportional chamber-magnet spectrometer. The phase of the pi exp - -p forward hadronic amplitude was found to go from negative value (at 30 GeV) to positive value (at 140 GeV), passing through zero at about 60 GeV. The logarithmic slope at small /t/ (/t/ approximately 0.03 (GeV/c) exp 2) has also been measured and was found to be higher by about 3 (GeV/c) exp -2 than the values determined at higher /t/ (/t/ = 0.2 (GeV/c) exp 2). (Atomindex citation 11:524460)

N81-15773/7 PC **A02**/MF **A01**
Pisa Univ. (Italy). Ist. di Fisica.
Intermediate Particle Distribution Through a QCD Resummation Mechanism.
F. Marchesoni, and S. Ruffo. Jan 80, 7p IFUP-1/80

By introducing a physically sensible infrared parameter, it was shown that it is possible to use an alternative resummation technique of quantum chromodynamics (QCD) perturbative expansion to evaluate intermediate particle distribution. The application of this procedure to large-particle distribution for the process pp yields neutral pion X was studied.

SLAC-PUB-2615 PC **A05**/MF **A01**
Stanford Linear Accelerator Center, CA.
E exp + E exp - Physics Today and Tomorrow: Four Tutorial Lectures Delivered at the Arctic School of Physics 1980.
M. L. Perl. Sep 80, 85p
Contract AC03-76SF00515

Four tutorial lectures were delivered to provide an introduction to high energy positron-electron annihilation physics, and to serve as a foundation for more advanced lectures. The first lecture discusses three subjects: the parameters of e exp + e exp - storage rings that are directly relevant to experiments, the physics of e exp + e exp - one-photon exchange as illustrated by the reaction e exp + e exp - implies mu exp + mu exp - , and the naive quark model for the reaction e exp + e exp - implies hadrons. The second lecture is devoted to heavy leptons: the status of the tau lepton, and the status of the search for heavier leptons. The third lecture discusses the nonrelativistic quantum mechanics of heavy quark-antiquark systems - the psi/J particle family and the T particle family. As e exp + e exp - colliding beams machines attain very high energy, E/sub c.m./ greater than or equal to 50 GeV, e exp + e exp - annihilation will occur through the weak interactions as well as through the electromagnetic interaction; this will allow the study of the weak interactions and the study of any new particle related to, or produced through, the weak interactions. Lecture 4 discusses this physics at an energy corresponding to the mass of the Z exp 0 intermediate boson, and then discusses the physics at yet higher energy. The lecture concludes with a description of the capabilities and limitations of the e exp + e exp - colliding beams machines needed to attain this very high energy - both storage rings and colliding linear accelerators. 78 references, 19 figures, 7 tables. (ERA citation 06:006712)

20I. Plasma Physics

AD-A093 639/3 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Physics and Astronomy.
Collisional Drift Waves in a Plasma with Electron Temperature Inhomogeneity.
J. F. Drake, and A. B. Hassam. 1 Sep 80, 33p
Rept nos. PUB-81-058, PL-81-008
Contract DE-AC05-79ET-53044

A fluid theory of collisional electrostatic drift waves in a plasma slab with magnetic shear is presented. Both electron temperature and density gradients are included. The equations are solved analytically in all relevant regions of the parameter space defined by the magnetic shear strength and the perpendicular wavelength and explicit expressions for the growth rates are given. For shear strengths appropriate for present-day tokamak discharges the temperature gradient produces potential wells which localize the mode in the electron resistive region, well inside the ion sound turning points. Mode stability arises from a competition between the destabilizing influence of the time dependent thermal force and the stabilizing influence of electron energy dissipation. Convective energy loss is not important for shear parameters of present-day fusion devices. (Author)

N81-15832/1 PC **A04**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Supression of Beam-Excited Electron Waves by an Externally Applied RF Signal.
O. Fukumasa, and R. Itatni. Nov 80, 57p IPPJ-488

Suppression of the beam excited electron wave in a bounded system is investigated in connection with the beam distribution function. Wave suppression has two different processes depending on whether injected beams are reflected at the other end or not. In the absence of reflected beam electrons, deformation of the beam distribution function is observed in relation to the suppression of the electron wave. However, when beam electrons are reflected, the external wave suppresses the electron wave but distribution function shows no appreciable change. Experimental results show that nonlinear behaviors of beam electrons, namely behaviors of reflected beams, are quite important for wave suppression. By using the method of partial simulation, interaction between two waves in the bounded system including nonlinear motions of beam electrons is studied numerically. Qualitative agreement between experimental and numerical results is obtained.

N81-15834/7 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Non-Axisymmetric Alfven Wave Excited by a Helical Coupler.
Y. Amagishi, M. Inutake, T. Akitsu, and A. Tsushima. Nov 80, 30p IPPJ-491

A helical coupler in a cylindrical helium plasma with a finite beta value is used to excite nonaxisymmetric Alfven waves. The helical coupler, which consists of two symmetrical helical windings, exhibits a strong propagation directionality: slow waves of the m = -1 mode and fast waves of the m = +1 mode can be lauched simultaneously from the coupler, but propagate each other in the opposite directions along the static magnetic field. Dispersion relations for both modes are fairly compared with a magnetohydrodynamic theory on the assumption of appropriate boundary conditions. As a nonlinear phenomenon, subharmonic slow Alfven waves of the m = -1 mode are observed when the pump frequency is close to or above the ion cyclotron frequency.

N81-15861/0 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Toroidal Resonance and Cut off Surfaces in the Ion Cyclotron Frequency Range.
T. Hellsten, and E. Tennfors. Dec 79, 29p
TRITA-PFU-79-11, ISSN-0348-7644
Sponsored by Euratom.

Resonances and cut off surfaces in the ion cyclotron regime were studied for a multicomponent plasma in an axisymmetric toroidal geometry. Three resonances appear: the fundamental ion cyclotron resonance, Buchsbaum ion-ion hybrid resonance, which is a resonance for the slow quasielectric wave, and the perpendicular ion cyclotron resonance, which is a resonance for the fast electromagnetic wave. The last mentioned resonance surfaces coincide with the magnetic surfaces. The cut off concept was generalized to be applicable to differential equations. A category of cut off surfaces are defined by the apparent singularities being independent of the gradient of the equilibrium quantities. The problem of finding resonance and cut off surfaces for an axially symmetric plasma was reduced to a problem of solving ordinary differential equations.

PB81-859456 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Solitons. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Feb 81, 238p

This retrospective bibliography contains citations concerning theoretical and analytical considerations and experimental observations of plasma solitons (solitary waves). The formation or excitation mechanisms, structure and stability characteristics, propagation or interaction dynamics, and perturbation-induced modifications of solitons in both natural and manmade plasmas are also discussed. (Contains 277 citations, fully indexed and including a table of contents.)

20J. Quantum Theory

AD-A093 579/1 Not available NTIS
New York Univ., NY. Dept. of Physics.
Theory of Coherences Produced by Radiatively Assisted Inelastic Collisions: Weak-Field Impact-Core Limit,
Paul R. Berman. 21 Mar 80, 22p
Contract N00014-77-C-0553
Availability: Pub. in Physical Review A, v22 n5 p1848-1868 Nov 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 580/9 Not available NTIS
New York Univ., NY. Dept. of Physics.
Theory of Collisionally Aided Radiative Excitation in Three-Level Systems.
S. Yeh, and P. R. Berman. 18 Mar 80, 23p

Contract N00014-77-C-0553
Availability: Pub. in Physical Review A, v22 n4 p1403-1424 Oct 80 (No copies furnished by DTIC/NTIS).

No abstract available.

20K. Solid Mechanics

AD-A093 482/8 PC **A03**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Quadratic and Cubic Transition Elements.
Technical rept.,
M. A. Hussain, J. D. Vasilakis, and S. L. Pu. Nov 80, 26p ARLCB-TR-80044, AD-E440 102
Presented at the Conference of Army Mathematicians (26th), Hanover, NH, 10-12 Jun 80.

Based on the investigation of Barsoum, Henshell and Shaw, quarterpoint quadratic elements have been successfully used as crack tip elements in fracture mechanics. This concept of singular element was extended to cubic isoparametric elements. Recently it was discovered by Lynn and Ingraffea that under special configuration, transitional elements improve the accuracy of stress intensity factor computations. In this report, we have obtained the location of mid-side nodes of these transitional elements for the quadratic as well as cubic elements. The cubic transitional elements were used for the double-edge crack problem, and it was found that there was improvement in accuracy for a configuration which consisted only of singular and transitional elements. However, for a well laid out grid, the improvement was only marginal.

N81-15398/3 PC **A08**/MF **A01**
California Univ., Los Angeles.
Access 3. Approximation Concepts Code for Efficient Structural Synthesis: User's Guide.
C. Fleury, and L. A. Schmit. Sep 80, 153p NASA-CR-159260
Grant NSG-1490

A user's guide is presented for ACCESS-3, a research oriented program which combines dual methods and a collection of approximation concepts to achieve excellent efficiency in structural synthesis. The finite element method is used for structural analysis and dual algorithms of mathematical programming are applied in the design optimization procedure. This program retains all of the ACCESS-2 capabilities and the data preparation formats are fully compatible. Four distinct optimizer options were added: interior point penalty function method (NEWSUMT); second order primal projection method (PRIMAL2); second order Newton-type dual method (DUAL2); and first order gradient projection-type dual method (DUAL1). A pure discrete and mixed continuous-discrete design variable capability, and zero order approximation of the stress constraints are also included.

N81-15404/9 PC **A12**/MF **A01**
Ecole Nationale Superieure de Techniques Avancees, Paris (France).
Elastic Analysis of Anisotropic BEAMS Sensitive to Transverse Shear Analyse Elastique des Poutres Anisotropes Sensibles au Cisaillement Transversal.
Ph.D. Thesis - Univ. de Technologie de Compiegne, France.
C. Phang. Jul 79, 264p REPT-119
In French; English Summary. Sponsored by Direction des Recherche Etudes, et Technique.

The stresses, strains, and displacements in homogeneous orthotropic beams, sensible to transverse shear and subjected to transverse loads were analyzed using the problem of short beam bending test as an example. The approach involved splitting the original problem into a symmetrical problem and an antisymmetrical one. For this particular test, fine methods were used: the mixed variational principal, the exact solution of the linear elasticity, an approximate analytical method, the finite element method, and photoelastic experimental analysis. Good agreement between the exact solution, the finite element method and the photoelastic experimental analysis was obtained. The validity of the approximate analytical method which requires little computation and time for accurate determination of the stress distribution in isotropic beams is demonstrated. The mixed methods give satisfactory results in a section rather far from the concentrated loads for an orthotropic or isotropic beam.

SAND-80-1605C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Dynamic Relaxation Applied to the Quasi-Static, Large Deformation, Inelastic Response of Axisymmetric Solids.
S. W. Key, C. M. Stone, and R. D. Krieg. 1980, 36p CONF-800781-1
Contract AC04-76DP00789
US/Europe workshop on nonlinear finite element analysis in structural mechanics, Ruhr, F.R. Germany, 28 Jul 1980.

The use of dynamic relaxation as a solution strategy for the quasi-static, large deformation, inelastic response of solids is examined. The underlying mechanics, the constitutive theories of interest, the incremental form of the equations, the spatial discretization, and the implementation of dynamic relaxation for path and/or time dependent material response are each discussed. The mechanics are carried out in the current configuration of the body described by a fixed spatial coordinate system and using the Cauchy stress. Finite strain constitutive theories for elastic, elastoplastic, and creep behavior are introduced. An incremental form of the problem allowing a sequence of equilibrium solutions to be found is presented. A constant bulk strain, bilinear displacement isoparametric quadrilateral finite element is employed for the spatial discretization. The solution strategy used to generate the sequence of equilibrium solutions is dynamic relaxation which in the form adopted is based on explicit central difference pseudo-time integration and artificial damping. It is used to find the next solution as a result of an increment in time and/or load. Each solution must satisfy equilibrium to within a prescribed tolerance before proceeding to the next increment. Several example calculations are presented. (ERA citation 06:006360)

20L. Solid-State Physics

AD-A093 472/9 Not available NTIS
Harvard Univ., Cambridge, MA. Gordon McKay Lab.
Magnetic Properties of Compositionally Modulated Pd/Fe Films.
G. Dublon, M. P. Rosenblum, and W. T. Vetterling. 10 Mar 80, 3p
Contract N00014-77-C-0002, Grant NSF-DMR76-01111
Sponsored in part by Grant NSF-DMR79-07023.
Availability: Pub. in IEEE Transactions on Magnetics, vMAG16 n5 p1126-1128 Sep 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 506/4 PC **A07**/MF **A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Study of the Physics of Insulating Films as Related to the Reliability of Metal-Oxide Semiconductor Devices.
Interim rept. 1 Oct 79-30 Mar 80,
J. A. Calise, D. J. DiMaria, D. W. Dong, R. Ghez, and A. Hartstein. Nov 80, 139p RADC-TR-80-317
Contract F19628-78-C-0225, ARPA Order-2180

This report covers the high current injection into SiO2 using Si rich SiO2, the use of Raman scattering to observe amorphous Si in Si rich SiO2 and the crystallization of this amorphous Si at high temperatures, the use of attenuated total reflectance measurements to study Si rich SiO2, measurements of physical characteristics of oxides grown using high pressure oxidation, and the description of an automatic tester developed for use in electron and hole trapping studies. (Author)

AD-A093 623/7 PC **A04**/MF **A01**
Stanford Univ., CA. Stanford Electronics Labs.
Preparation and Properties of Al(x)Ga(1-4)As:Cr Single Crystals.
Final rept. 1 Oct 77-31 Aug 80,
Gerald L. Pearson. Sep 80, 66p
Contract N00014-78-C-0297

This research program is divided into the following four related topics: (1) Growth of Al(x)Ga(1-4)As:Cr thin semi-insulating (SI) layers by liquid phase epitaxial (LPE) techniques, (2) Properties of Cr deep levels in Al(x)Ga(1-4)As:Cr single crystals (3) Investigation of the interface properties of (SI)AlxGa1-xAs:Cr-(n)GaAs heterojunctions and (4) Construction and properties of Au-(SI)Al(x)Ga(1-4)As:Cr-(n)GaAs-(SI)GaAs:Cr MIS field effect transistor structures. Methods have been developed for reproducibly growing high quality Cr doped single crystal layers having selected values of x between 0.0 and 0.9 with specified thicknesses between 300 A and several micrometers. The results were analyzed to determine the current-transport mechanisms as well as to obtain information on the localized states and electron potential at the (SI)AlGaAs-GaAs interface. Two different insulated gate field-effect transistor structures were designed which consist of (1) a self aligned p-channel device formed by Zn diffusion and (2) an n-channel transistor formed by e-beam lithography and sulfur ion implants. Electrical measurements on the former established that a p-channel was formed and quantitative values of its properties were obtained. The latter is still under development.

AD-A093 652/6 PC **A05**/MF **A01**
GTE Labs., Inc., Waltham, MA.
Nonlinear Interactions between Laser Radiation and Spin-Aligned Carriers in Semiconductors.
Final rept.,
E. J. Johnson, R. W. Davies, and A. Lempicki. 25 Nov 80, 97p AFOSR-TR-80-1324
Contract F49620-78-C-0082

The central theme of this work is the effect of radiation upon the vector orientation of characteristic properties of photo-excited carriers in semiconductors. The orientation is referred to the direction of propagation and the polarization state of the exciting light. Initially the emphasis was on the optical properties of spin-aligned electrons, particularly their behavior in stimulated emission. The scope was extended to include ordering of orbital angular moments, and electron wave vectors as well. The material of choice was GaAs, now rapidly emerging as most important for a variety of optical, electronic and optoelectronic applications. The work performed falls into three categories: (a) development of novel experimental techniques (b) development of new theoretical approaches and (c) development of improved material. In the short duration of this contract the work remains, incomplete; however, we have made progress of considerable consequence in the areas where we had anticipated difficulty, thus providing a longer term challenge. (Author)

AD-A093 715/1 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins.
Balance Equation Formulation and Memory Effects in Retarded High Field Semiconductor Transport.
Technical rept.,
D. K. Ferry, and J. R. Barker. 4 Dec 79, 6p Rept no. CSU-TR-N-80-9
Contract N00014-78-C-0124
Pub. in Jnl. of Physics and Chemistry of Solids, v41 p1083-1087 1980.

No abstract available.

AD-A093 716/9 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins.
Long-Time Tail of the Autocorrelation Function for Electron Drift in High Electric Fields in Silicon.
Technical rept.,
D. K. Ferry. 12 May 80, 4p Rept no. CSU-TR-N-80-10
Contract N00014-78-C-0124
Pub. in Physical Review Letters, v45 n9 p758-760, 1 Sep 80.

No abstract available.

AD-A093 717/7 PC A02/MF A01
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Inversion Layer Transport and Properties of Oxides on InAs.
Technical rept.,
D.A. Baglee, D.K. Ferry, C.W. Wilmsen, and H.H. Wieder. 25 Feb 80, 7p Rept no. CSU-TR-N-80-8
Contract N00014-78-C-0124
Pub. in Jnl. of Vacuum Science and Technology, v17 n5 p1032-1036 Sep-Oct 80.

No abstract available.

AD-A093 724/3 PC A02/MF A01
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
On the Use of Monte Carlo Techniques for the Calculation of Transient Dynamic Response in Semiconductors.
Technical rept.,
D. K. Ferry, and J. R. Barker. 25 Feb 80, 8p Rept no. CSU-TR-N-80-11
Contract N00014-78-C-0124
Pub. in Physica Status Solidi (b), v100 683-689 1980.

No abstract available.

AD-A093 853/0 PC A02/MF A01
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Pulse Annealing Deficiencies in GaAs,
D. Eirug Davies, J. P. Lorenzo, and T. G. Ryan. 16 May 80, 6p Rept no. RADC/ETR-80-0035
Pub. in Applied Physics Letters, v37 p612-615, 1 Oct 80.

No abstract available.

AD-A093 894/4 PC A02/MF A01
Wisconsin Univ.-Milwaukee. Dept. of Physics.
Strong-Coupling Theory for the Driving Force in Electromigration.
Interim rept. 1 Jan-31 Dec 79,
P. R. Rimbey, and R. S. Sorbello. 22 Jan 79, 14p AFOSR-TR-80-1275
Grant AFOSR-76-3082
Pub. in Physical Review B, v21 n6 p2150-2161, 15 Mar 80.

No abstract available.

AD-A093 901/7 PC A02/MF A01
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Angle-Resolved Photoemission, Valence-Band Dispersions E(k), and Electron and Hole Lifetimes for GaAs,
T. C. Chiang, J. A. Knapp, M. Aono, and D. E. Eastman. 3 Dec 79, 12p AFOSR-TR-80-1348
Contract F44620-76-C-0041
Pub. in Physical Review B, v21 n8 p3513-3522, 15 Apr 80.

No abstract available.

AD-A093 902/5 PC A02/MF A01
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Experimental Energy-Band Dispersions, Critical Points, and Spin-Orbit Splittings for GaSb Using Angle-Resolved Photoemission,
T. C. Chiang, and D. E. Eastman. 7 Dec 79, 6p AFOSR-TR-80-1349
Contract F44620-76-C-0041
Pub. in Physical Review B, v22 n6 p2940-2944, 15 Sep 80.

No abstract available.

AD-A093 903/3 PC A02/MF A01
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Experimental Energy-Band Dispersions and Magnetic, Exchange Splitting for Cobalt,
F. J. Himpsel, and D. E. Eastman. 16 Oct 79, 8p AFOSR-TR-80-1350
Contract F44620-76-C-0041, Grant NSF-DMR77-21888
Pub. in Physical Review B, v21 n8 p3207-3213, 15 Apr 80.

No abstract available.

AD-A093 904/1 PC A02/MF A01
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Resonant Photoemission Shake-up and Auger Processes at the 3p Photothreshold in Ga and GaP,
T. -C. Chiang, and D. E. Eastman. 6 Dec 79, 7p AFOSR-TR-80-1351
Contract F44620-76-C-0041
Pub. in Physical Review B, v21 n12 p5749-5754, 15 Jun 80.

No abstract available.

AD-A093 906/6 PC A02/MF A01
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Geometrical and Electronic Structure of Si(001) and Si(111) Surfaces: A Status Report,
D. E. Eastman. 24 Oct 79, 10p AFOSR-TR-80-1353
Contract F44620-76-C-0041
Pub. in Jnl. of Vacuum Science and Technology, v17 n1 p492-500 Jan/Feb 80.

No abstract available.

AD-A093 907/4 PC A02/MF A01
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Silicide Schottky Barriers: An Elemental Description,
J. L. Freeouf. 17 Dec 79, 4p AFOSR-TR-80-1354
Contract F44620-76-C-0041
Pub. in Solid State Communications, v33 p1059-1061 1980.

No abstract available.

AD-A093 911/6 Not available NTIS
California Univ., Los Angeles. Dept. of Physics.
Ferroelectric, Photochromic, and Electrochromic Glasses,
R. Braunstein, and I. Lefkowitz. 1980, 7p ARO-14249.12-P
Grant DAAG29-76-G-0321
Prepared in cooperation with North Carolina Univ., Chapel Hill. Dept. of Physics.
Availability: Pub. in Ferroelectrics, v27 p225-230 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A093 943/9 PC A02/MF A01
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Scattering of Inversion Layer Electrons by Oxide Polar Mode Generated Interface Phonons.
Technical rept.,
B. T. Moore, and D. K. Ferry. 22 Feb 80, 6p Rept no. CSU-TR-N-80-7
Contract N00014-78-C-0124
Pub. in Jnl. of Vacuum Science and Technology, v17 n5 p1037-1040 Sep-Oct 80.

No abstract available.

AD-338 555/6 PC A04/MF A01
David Taylor Model Basin, Washington, DC.
Report to the Scientific Director. Hull Response and Shock Motion-Discussion and Analysis
H.L. Rich, E.T. Habib, R.L. Bort, and F. Weinberger. Jun 56, 60p DASA-WT1024
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

This report analyzes and interprets the results obtained and reported by Project 3.2 in WT-1023 (to be published). The shock motion of hull structures and simulated equipments of the sub merged targets is discussed. The measured rigid body axial motion of the submerged SQUAWs is compared with the computed response of a cylinder subjected to an exponential pressure pulse. The general features of the shock motion of the sur faced targets are compared with the computed particle velocity of the surface water. The variation of shock motion of surface targets with horizontal range is discussed. Equipment damage to submerged and surfaced vessels is inferred from the analyzed measurements and compared with that from conventional explosive tests. It is concluded that submarines at a horizontal range of 7200 ft will be outside the surfacing-damage (severe equipment damage) range. Surface ships at a horizontal range of 5400 ft will receive light but widespread damage; at 7700 ft, damage will be inappreciable. (Author)

N81-15874/3 PC A03/MF A01
Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazoni.
Magnetic Behavior of Sn Superconducting Films in Perpendicular Magnetic Fields.
M. Flamini, S. Onori, and A. Rogani. 5 Mar 80, 30p ISS-P-80/1, ISSN-0390-6469
In Italian; English Summary.

The perpendicular critical magnetic field of Sn films was measured as a function of temperature (1.5 K to T sub c) and specimen thickness (65 nm to 200 micron m). The transition from thin film behavior was studied using a phase sensitive technique. The critical thickness separating intermediate state and mixed state behavior was determined.

PB81-148942 PC A03/MF A01
Spire Corp., Bedford, MA.
A Novel Technique for Fabricating Optoelectronic Materials.
Final rept. 1 Oct 79-31 Mar 80,
A. C. Greenwald. 1 Apr 80, 50p FR-80022, NSF/RA-800310
Grant NSF-DAR79-17704

The objective of this study was to investigate the application of high-current ion-implantation and pulsed electron-beam annealing to fabricate optoelectronic materials for heterostructural, injection electroluminescent devices and detectors. Gallium arsenide (GaAs) substrates were implanted at room temperature with P and Ga to form GaAs1-xPx, or were implanted with Al and As to form Ga1-xAlxAs. A large-area pulsed electron beam was used to melt only the radiation-damaged implanted surface layer which underwent epitaxial regrowth upon cooling. Samples were analyzed for crystal structure and composition only. Reflected electron diffraction confirmed the epitaxial single crystal structure of the surface. Auger spectroscopy with ion sputtering showed that the maximum value of x achieved for either compound (GaAsP or GaAlAs) was 0.1, a limit imposed by ion sputtering during implantation. The trinary compound films were approximately 500 nm thick. Graphs and photographs illustrate the text.

PB81-858524 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Amorphous Silicon Thin Films. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 63p

This retrospective bibliography on the properties of thin films of amorphous silicon as well as techniques for the deposition of these films. The properties include photoconductive, optical absorption, conductivity, and photoelectric. The effects of doping and impurities on the properties of the films are also reviewed. (Contains 60 citations, fully indexed and including a table of contents.)

20M. Thermodynamics

LA-8616-MS PC A02/MF A01
Los Alamos Scientific Lab., NM.
Computationally Efficient Expression for the Zero-Temperature Isotherm in Equations of State.
B. I. Bennett. Dec 80, 20p
Contract W-7405-ENG-36

A variation on the Barnes' modified Morse potential is given with two methods for determining empirical parameters. The new expression does not require the evaluation of a numerical integral to obtain the internal energy of the solid. Hugoniots computed using these two methods are compared with experimental data. (ERA citation 06:008770)

N81-15243/1 PC **A05**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Solution of the Two Dimensional Transient Heat Conduction Equation Through the Finite Element Method and the Saul'Ev Method for Time Derivation die Loesund der Zweidimensionalen Instationaeren Wagrmeleitgleichung MIT der Methode der Finiten Elemente und Dem Saul'Ev Verfahren Zur Zeitintegration.
A. Haner, R. Fremd, and F. Schmidt. Dec 79, 84p IKE-4-92
In German; English Summary.

The finite element method (FEM) is used for the solution of the two dimensional transient heat conduction equation. The time derivation is approximated by use of Saul'ev - ADE - method, which is modified for the FEM. Improvement to the method permits the use of any triangular element. The realization of the method is based on a modified version of the program DIFGEN which solves the neutron diffusion equation.

N81-15333/0 PC **A03**/MF **A01**
International Research and Development Co. Ltd., Fossoway (Scotland).
Comparative Study of Rotating Regenerators and Heat-Pipe Heat Exchangers.
Final rept.,
D. B. A. Macmichael, D. A. Reay, and E. L. Foster. 1980, 34p EUR-6792-EN
Sponsored by Commission of the European Communities.

A heat wheel was purchased and installed for air to air heat recovery on a Terylene fiber drying and setting oven at ICI Wilton. At the same time a heat pipe heat exchanger was prepared at IRD and tested under controlled conditions. The heat wheel was then replaced by the heat pipe unit. During this procedure measurements were made regularly to monitor the performance of the oven and the heat exchangers. Neither of the heat exchangers attained their rated conditions. It was concluded that recuperative energy conservation is technically and economically feasible, provided that attention is paid to the problems of air flow control and minimizing installation costs. It was also realized that a good saving could be made by paying attention to stray leaks from the oven and by reducing the exhaust air flow from the setting sections. On the question of comparative performance of the two heat exchangers it is not possible to propose that one type is preferable to the other, although the heat wheel created more problems in respect of maintaining airflow.

UCRL-52863 PC **A24**/MF **A01**
Lawrence Livermore National Lab., CA.
Conduction Heat Transfer Solutions.
J. H. VanSant. Mar 80, 558p
Contract W-7405-ENG-48

This text is a collection of solutions to a variety of heat conduction problems found in numerous publications, such as textbooks, handbooks, journals, reports, etc. Its purpose is to assemble these solutions into one source that can facilitate the search for a particular problem solution. Generally, it is intended to be a handbook on the subject of heat conduction. This material is useful for engineers, scientists, technologists, and designers of all disciplines, particularly those who design thermal systems or estimate temperatures and heat transfer rates in structures. More than 500 problem solutions and relevant data are tabulated for easy retrieval. There are twelve sections of solutions which correspond with the class of problems found in each. Geometry, state, boundary conditions, and other categories are used to classify the problems. A case number is assigned to each problem for cross-referencing, and also for future reference. Each problem is concisely described by geometry and condition statements, and many times a descriptive sketch is also included. At least one source reference is given so that the user can review the methods used to derive the solutions. Problem solutions are given in the form of equations, graphs, and tables of data, all of which are also identified by problem case numbers and source references. (ERA citation 06:006391)

20N. Wave Propagation

AD-A093 641/9 PC **A02**/MF **A01**
Office of Naval Research, London (England).
U.R.S.I. Symposium 1980 on Electromagnetic Waves.
Conference rept.,
T. C. Cheston, and David K. Cheng. 22 Oct 80, 8p Rept no. ONRL-C-6-80

L.B. Felsen of the Polytechnic Institute of New York discussed a hybrid-ray-mode field formulation in inhomogeneous media (Paper No. 111B). High-frequency fields radiated by sources in transversely inhomogeneous waveguides or ducts are usually analyzed in terms of a normal-mode expansion or by ray techniques. However, these techniques lead to computational difficulties for poorly convergent fields which involve an excessively large number of modes or rays, and corrections are required near the caustics and cusps of the ray system. Felsen suggested a hybrid formulation representation which utilizes an appropriately chosen mixture of modal fields and ray fields. The motivations are to achieve a fast convergence and therefore an ease of computation, to afford a better physical insight, and to avoid difficult transition regions where caustics and cusps accumulate. This hybrid representation has been applied to analyze high-frequency underwater sound propagation in ocean channels (Paper No. 121C by S.H. Cho and Felsen) and wave propagation in tropospheric ducts and along concave conducting surfaces.

AD-A093 818/3 MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
South American Flight Test Report.
Interim test rept. 1 Mar-30 Apr 79,
Allen L. Johnson, Robert C. Beach, Wayne O. Fischbach, Ralph N. Wright, and Wade T. Hunt. Oct 80, 64p Rept no. AFWAL-TR-80-1079
Availability: Microfiche copies only.

A flight test was conducted into the equatorial region to investigate UHF ionospheric scintillation fading. The test involved the Avionics Laboratory SATCOM-equipped aircraft and the Air Force Geophysics Laboratory flying ionospheric laboratory. Equatorial UHF ionospheric scintillation fading was encountered approximately 25% of test period. A multipath fading mitigation technique was tested which utilizes signals received on bottom and top mounted antennas to reduce the fading effect. The ASC-28 Dual Frequency SATCOM terminal was evaluated during the test flights. The performance of the EHF and SHF antennas during zenith operation was successfully demonstrated. The ASC-31 1-kw UHF power amplifier was tested using the ARC-171 UHF transceiver as a driving source. (Author)

AD-A093 919/9 Not available NTIS
City Coll., New York. Dept. of Physics.
Representation of Vector Electromagnetic Beams,
D. N. Pattanayak, and G. P. Agrawal. 13 Nov 79, 8p TR-4, ARO-16629.2-P
Contract DAAG29-81-K-0005
Availability: Pub. in Physical Review A, v22 n3 p1159-1164 Sep 80 (No copies furnished by DTIC/NTIS).

No abstract available.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A093 712/8 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Combustion Studies of Oil/Water Emulsions.
Final rept. 1 Aug 77-30 Sep 80,
C. K. Law. Nov 80, 10p ARO-15102.7-E
Grant DAAG29-77-G-0188

The fundamental combustion characteristics of water/oil emulsions are studied. It is identified that the combustion behavior primarily depend on: (1) the relative volatilities and concentrations of water and oil, (2) the liquid-phase motion, and (3) the fact that water and oil do not mix. Based on these various theoretical models, descriptions of droplet combustion in sprays are formulated and subsequently verified experimentally. The potential of disruptive droplet combustion leading to enhanced atomization and mixing are explored. A possible mechanism which may be responsible for the fire-safety nature of water/oil emulsions is suggested and directions for further optimization of emulsion formulation based on this concept are identified. Diesel engine testings show significant reduction in soot emulsion without adverse effect in combustion efficiency by using emulsions with 10 to 20 percent water. (Author)

AD-A093 815/9 MF **A01**
Sheffield Univ. (England). Dept. of Chemical Engineering and Fuel Technology.
Combustion-Transition Interaction in a Jet Flame.
Interim rept.,
A. J. Yule, N. A. Chigier, S. Ralph, R. Boulderstone, and J. Ventura. Jan 80, 11p AFOSR-TR-80-1367
Grant AFOSR-77-3414
Presented at the AIAA Aerospace Sciences Meeting (18th), Pasadena, CA, 14-16 Jan 80, Paper AIAA-80-0077.
Availability: Microfiche copies only.

No abstract available.

AD-A093 858/9 Not available NTIS
Propellants, Explosives and Rocket Motor Establishment, Westcott (England).
Computation of Structures of Flames with Recirculating Flow and Radial Pressure Gradients,
D. E. Jensen, D. B. Spalding, D. G. Tatchell, and A. S. Wilson. 1979, 20p PERME-MEMO-78, DRIC-BR-75879
Availability: Pub. in Combustion and Flame, v34 p309-326 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

ANL/CEN/FE-80-12 PC **A04**/MF **A01**
Argonne National Lab., IL.
Evaluation of Alkali Metal Sulfate Dew Point Measurement for Detection of Hot Corrosion Conditions in PFBC Flue Gas.
J. E. Helt. Nov 80, 53p
Contract W-31-109-ENG-38

Hot corrosion in combustion systems is, in general, the accelerated oxidation of nickel, cobalt, and iron-base alloys which occurs in the presence of small amounts of impurities - notably, sodium, sulfur, chlorine, and vanadium. There is no real consensus on which mechanisms are primarily responsible for high-temperature corrosion. One point generally accepted, however, is that corrosion reactions take place at an appreciable rate only in the presence of a liquid phase. When coal is the fuel for combustion, hot corrosion may occur in the form of accelerated sulfidation. It is generally agreed by investigators that molten alkali metal sulfates (Na sub 2 SO sub 4 and K sub 2 SO sub 4

) are the principal agents responsible for the occurrence of sulfidation. Although molten sodium sulfate by itself appears to have little or no effect on the corrosion of metal alloys, its presence may increase the accessibility of the bare metal surface to the external atmosphere. If this atmosphere contains either a reductant and/or an oxide such as SiO sub 2 , SO sub 3 , or NaOH(Na sub 2 O), corrosion is likely to occur. Alkali metal sulfate dew point measurement was evaluated as a means of anticipating hot corrosion in the gas turbine of a pressurized fluidized-bed combustion system. The hot corrosion mechanism and deposition rate theory were reviewed. Two methods of dew point measurement, electrical conductivity and remote optical techniques, were identified as having a potential for this application. Both techniques are outlined; practical measurement systems are suggested; and potential problem areas are identified. (ERA citation 06:006295)

DOE/ET/12297-T1 PC **A04**/MF **A01**
Combustion Power Co., Inc., Menlo Park, CA.
Lignite Combustion Test Project Interim Report: Tests L101-L114.
K. E. Phillips, and K. B. Wilson. Aug 80, 55p
Contract AC03-78ET12297

Fluidized bed combustion research on North Dakota lignite is being performed by Combustion Power Company, Inc. under contract to Grand Forks Energy Technology Center in a 7 sq ft Atmospheric Fluid Bed Combustor. A series of 14 parameteric tests have been completed in which various combinations of bed temperature, superficial velocity, excess air, and limestone Ca/S ratios made up the test matrix. Twelve of the 14 tests used ash recycle. The test results extend the lignite combustion characteristics determined from GFETC tests on smaller reactors with respect to: (1) sulfur retention on lignite ash and supplemental sorbents; (2) ash and bed agglomeration problems; (3) effect of operational conditions and bed characteristics on heat transfer coefficient; (4) ash reinjection; and (5) flue gas pollutants. This interim report summarizes the test setup, test procedures and test results, describes operational problems, and provides observations noted during the tests and on post-test inspections. (ERA citation 06:005718)

21C. Electric Propulsion

PB81-859357 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Engines. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Feb 81, 59p NERACEDBNT2541

The citations in this bibliography cover plume characterization of pulsed plasma thrustors, experimental and theoretical analysis of plasma exhaust, plasma igniters for internal combustion engines, plasma engineering studies for experimental power reactors, design and applications of magnetoplasmadynamic (MPD) propulsion system. The dynamics and characteristics of plasma engines are also included in this bibliography. (Contains 51 citations, fully indexed and including a table of contents.)

PB81-859365 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Engines. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Feb 81, 163p NERACIAANT2541

The citations in this bibliography cover plume characterization of pulsed plasma thrustors, experimental and theoretical analysis of plasma exhaust, plasma igniters for internal combustion engines, plasma engineering studies for experimental power reactors, design and applications of magnetoplasmadynamic (MPD) propulsion system. The dynamics and characteristics of plasma engines are also included in this bibliography. (Contains 159 citations, fully indexed and including a table of contents.)

21D. Fuels

AD-A093 842/3 PC **A08**/MF **A01**
Exxon Research and Engineering Co., Linden, NJ. Products Research Div.
Effect of Refining Variables on the Properties and Composition of JP-5.
Final rept. Sep 78-Feb 80,
Martin Lieberman, and William F. Taylor. Nov 80, 162p Rept no. EXXON/RL.2PE.80
Contract N00140-78-C-1491

The primary objective of this program was to identify potential future problem areas that could arise from changes in the composition, properties and potential availability of JP-5 produced in the near future. The study employed a systems type approach, looking at the various processing trains used to make JP-5 in the U.S. and abroad, the types of crudes used with the different processing trains and the crude-processing interactions that might impact on the quality and potential availability of JP-5 produced in the near future. Analyses were made separately for the two major geographical regions (PADs) currently producing JP-5 for the U.S. Navy. Potential fuel problems concerning thermal stability, lubricity, low temperature flow, combustion, and the effect of the use of specific additives on fuel properties and performance were identified and discussed.

BNL-50898 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Use of Wood as an Energy Source in the State of Maine.
T. von Foerster. Sep 78, 87p
Contract AC02-76CH00016

A detailed study is presented of the availability and use of wood as an energy resource for the State of Maine. Although there are no good data on the total resources of Maine's forests, the best estimates indicate that one could obtain about 1/2 quad (10 exp 15 Btu) per year from thinning overstocked stands and harvesting dead trees; current logging operations could produce about the same amount of energy in the form of logging residues and thinnings, an amount that could be increased manyfold by intensive forest management. The costs of wood for fuel can be estimated on the basis of current logging and transportation costs. The corresponding energy prices, while high, are competitive with current fossil fuel prices. Using any energy source requires not only the fuel but also a furnace. The total energy costs are thus not only the cost of current fuel use but also those of the capital investment in the furnace. We have estimated these for systems of two sizes, one for a small house, the other for an apartment building or small commercial establishment. In both cases, our estimated indicate, that woodfueled systems can be economically competitive. Wood is currently used as a fuel on a large scale in the pulp and paper industry. With some increase in wood harvesting efforts and some alterations of furnaces that industry could achieve energy self sufficiency. Other large-scale uses are still speculative but deserve further investigation. A state-owned energy corporation could serve to provide a market for currently wasted wood and to investigate the conversion of wood to other forms of energy. The combustion of wood is not associated with environmental effects that are different kind in magnitude from those associated with the combustion of fossil fuel. (ERA citation 06:002163)

CONF-7904102- PC **A10**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Industrial Coal Utilization.
1979, 221p
Industrial coal utilization conference, Pittsburgh, PA, USA, 3 Apr 1979.

The effects of the National Energy Act on the use of coal in US industrial and utility power plants are considered. Innovative methods of using coal in an environmentally acceptable way are discussed: furnace types, fluidized-bed combustion, coal-oil-mixtures, coal firing in kilns and combustion of synthetic gas and liquid fuels. Fuel use in various industries is discussed with trends brought about by uncertain availability and price of natural gas and fuel oils: steel, chemical, cement, pulp and paper, glass and bricks. The symposium on Industrial Coal Utilization was sponsored by the US DOE, Pittsburgh Energy Technology Center, April 3 to 4, 1979. Twenty-one papers have been entered individually into the EDB. (ERA citation 06:005713)

CONF-8004137-1 PC **A02**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Div. of Chemical Development.
Environmental Consideration for TVA'S Ammonia from Coal Project.
P. C. Williamson, and D. A. Waitzman. 1980, 18p
Environmental symposium, New Orleans, LA, USA, 7 Apr 1980.

TVA's Ammonia from Coal Project involves retrofitting a coal gasification process to the front end of its existing 225-ton-per-day ammonia plant. The purpose of the project is to develop design and operating data to assess the technological, economic, and environmental aspects of substituting coal for natural gas in the manufacture of ammonia. Startup of the facility is scheduled for August 1980. No environmental regulations presently exist specifically for coal gasification facilities. TVA's approach to the problem is to meet or exceed the emission control requirements for specific components, i.e., sulfur compounds particulates, aqueous discharges, etc. In addition, TVA's facility contract specified limits on certain discharges based on anticipated guidelines. The gasification plant and process are described. Permit requirements for plant operation in Alabama have been met. Solid wastes are to be disposed of in a sanitary landfill. Precautionary measures are described. Environmental study areas are outlined. These include: gaseous, liquid, and solid waste monitoring and characterization; radiological characterization; medical surveillance; and basic industrial hygiene. Possible hazardous agents are described. (ERA citation 06:005648)

COO-4530-1 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park.
Utilization of Alternate Fuels in Diesel Engines.
S. S. Lestz. Sep 80, 52p CAES-577-80
Contract AS02-77CS54530

Accomplishments during three years entitled The Utilization of Alternate Fuels in Diesel Engines are summarized. Experiments were designed and test equipment set-up for the purpose of evaluating the use of methanol as a fumigant for light-duty Diesel engine service. The major experimental results were obtained from a multicylinder automotive Diesel engine. However, fundamental studies employing a GC/micro-reactor and a constant volume combustion bomb were also started. The purpose of this work was to measure some of the chemical and physical properties of methanol and methanol-air mixtures. The laminar flame velocity for various mixtures has been measured in the combustion bomb and thermal degradation studies have begun in the GC/micro-reactor. An Oldsmobile 5.7 liter V/8 Diesel engine was fumigated with methanol in amounts up to 40% of the fuel energy. The primary objectives of the study were to determine the effect of methanol fumigation on fuel efficiency, smoke, nitric oxide emission, and the occurrence of severe knock. An assessment of the biological activity for samples of the raw exhaust particulate and its soluble organic extract was also made using boh the Ames Salmonella typhimurium test and the B. subtilis Comptest. Generally, methanol fumigation was found to decrease NO emission for all conditions, to have a slight effect on smoke opacity, and to have a beneficial effect on fuel efficiency at higher loads. Also at higher loads, the methanol was found to induce what was defined as knock limited operation. The biological activity of the raw particulate matter was fond to be less than that of its soluble organic extract. However, for both the fumigation of methanol did enhance the biological activity. (ERA citation 06:006221)

DFE-31 PC **A03**/MF **A01**
Delegationen foer Energiforskning, Stockholm (Sweden).

Production of a Raw Material for Energy Production in Agriculuture.
G. Hellstroem. Apr 80, 48p
In Swedish.
U.S. Sales Only.

The total amount of energy in products produced by Swedish agriculture has been estimated to 80 TWh: 30 TWh for cereals, 15 TWh for grass and leguminosae, and 35 TWh for straw and other agricultural wastes. Of this production a large part will be used as food even in the future. The report discusses new plants that would produce more energy than the ones traditionally grown in Sweden. Also other types of energy from agriculture are discussed such as methane from manure, methanol from gasification processes, and ethanol from fermentative processes. Costs are estimated for different alternatives. (ERA citation 06:005863)

DFE-31(App.2) PC **A02**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala.
Calculation of Energy Balances for Energy Crops.
K. G. Bergman. 5 Feb 80, 23p
In Swedish.
U.S. Sales Only.

Energy balances have been calculated for 20 different crops and for forests grown in Sweden for energy production. The most favorable energy balances were found for sugar beets and leguminosae. (ERA citation 06:005885)

DFE-31(App.3) PC **A02**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala.
Calculation of Production Costs for Energy Crops.
K. G. Bergman. 5 Feb 80, 18p
In Swedish.
U.S. Sales Only.

Production costs have been calculated for different crops grown in Sweden. The crops are intended for energy production. The crops are: wheat, rye, barley, grass, leguminosae, maize, potatoes, rape, sugar-beets. Calculations have also been made for straw, reed, and an extensively grown energy forest. Among these the cheapest per MWh energy plants were reed and energy wood. The most expensive were potatoes and rape. (ERA citation 06:005886)

DFE-31(App.4) PC **A04**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala.
One-Year Agricultural Plants as Raw Material for Energy Production and Industry.
C. Sandenskog, and U. Wuensche. Feb 80, 62p
In Swedish.
U.S. Sales Only.

The growing of agricultural plants for energy production is discussed. For Sweden it is considered that straw from cereals could be used for direct combustion. Among plants grown especially for energy production by combustion, maize, hemp, and energy grasses are considered most suitable for Sweden. It would be feasible to use sugar beets, cereals, and potatoes for the production of ethanol. (ERA citation 06:005887)

DFE-31(App.5) PC **A03**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala.
Perennial Plants as Raw Material for Energy Production and Industry.
B. Falk. Feb 80, 35p
In Swedish.
U.S. Sales Only.

Different types of grass and leguminous plants and their use for energy production are discussed. The agricultural yields, harvesting conditions, the calorific value, chemical composition and ash contents are given. It is considered that it is possible to use grass for energy production. As grass has a quite high ash content, 4 to 8 times the ash content for wood, it is recommended that grass will be used for fermentation to methane. Growing of extensive energy forests is also considered. The ash content of wood is only 0.5 to 1% which makes it useful as a fuel. The calorific value is about 5.3 kwh per kg dry matter. Harvesting after 10 years gives about 5 tons dry matter per hectare and year. (ERA citation 06:005888)

DFE-31(App.7) PC **A02**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala.
Can Straw Be Better Used.
S. Claesson. Jan 80, 13p
In Swedish.
U.S. Sales Only.

Straw as a source of energy is discussed. Tables show the amounts of straw produced by different kinds of cereals and oil-yielding plants grown in Sweden. Within the stubble height of 10 to 25 cm every cm gives 75 to 100 kg dry material per hectare. The report also discusses the consequences of taking away the straw from the soil, and not using it for soil improvement. Only the greatest agricultural areas of Sweden may be used as suppliers of straw for energy production, because of other areas the transport costs will be too high. The straw is considered to be a valuable fuel in future Swedish energy production, although it is quite expensive to harvest and store. Some development of machinery is also needed. (ERA citation 06:005889)

DOE/AF/10001-01 PC **A13**/MF **A01**
Computer Sciences Corp., Washington, DC.
Fuel Alcohol Opportunities for Indiana.
Aug 80, 282p
Contract AC01-79CR10001

Prepared at the request of US Senator Birch Bayh, Chairman of the National Alcohol Fuels Commission, this study may be best utilized as a guidebook and resource manual to foster the development of a statewide fuel alcohol plan. It examines sectors in Indiana which will impact or be impacted upon by the fuel alcohol industry. The study describes fuel alcohol technologies that could be pertinent to Indiana and also looks closely at how such a fuel alcohol industry may affect the economic and policy development of the State. Finally, the study presents options for Indiana, taking into account the national context of the developing fuel alcohol industry which, unlike many others, will be highly decentralized and more under the control of the lifeblood of our society - the agricultural community. (ERA citation 06:002135)

DOE/CS/21051-01 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Energy.
Fuels and Chemicals Made from Solar Energy. Options for the 1990's and Beyond.
Aug 80, 13p
Contract AC01-79ET21051

The concept and feasibility of using solar thermal systems to produce gaseous and liquid fuels and feedstocks from non-renewable resources such as coal, lignite, and peat and from renewable resources such as water and waste organic materials are discussed. Some of the commercially important reactions now being considered as candidates for solar thermal technology are mentioned including synthesis gas production, shale oil processing, decomposition of water, ammonia production, styrene manufacture, and inorganic chemicals processes. DOE research programs in this area are briefly discussed. (ERA citation 06:002203)

DOE/CS/54240-T1 PC **A07**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Hybrid Fuels for Highway Transportation. Second Annual Technical Progress Report for the Period 1 June 1979-1 June 1980.
T. W. Ryan, W. Likos, and C. A. Moses. Jun 80, 134p
Contract AC04-78CS54240

A program has been developed to investigate the potential of hybrid fuels for use in highway transportation. Hybrids are fuels derived from combinations of readily available energetic non-conventional materials with petroleum. They are generally formulated as solutions, emulsions, or slurries. The underlying objective of the program is to reduce the use of petroleum-derived fuels and/or to minimize the processing requirements of the finished hybrid fuels. During the first year of the program, extensive work was done on the development and testing of water and alcohol emulsions and alcohol solutions. In the second year, the emphasis was placed on the development and testing of hybrid fuel slurries. Components evaluated included carbohydrates and various forms of carbon. It was concluded that, of the slurries tested, the carbon (coke, carbon black, etc.) slurries have the most potential for development into finished fuels. The efforts during the third year will concentrate on advancing the development of the slurries (especially the carbon slurries) to the same point as the solutions and emulsions. This work will include examination of the mechanical difficulties, the stability problems, and the combustion phenomena observed when using slurries in heat engines. (ERA citation 06:006257)

DOE/ET/11017-T1 PC **A04**/MF **A01**
General Electric Co., Philadelphia, PA. Re-Entry and Environmental Systems Div.
Energy from Marine Biomass. Quarterly Report, July 1-September 30, 1978.
A. N. Tompkins. 20 Oct 78, 67p
Contract AC03-78ET11017

A major milestone was completed in the Oceans Engineering area with the successful deployment of the Test Farm. All systems were installed by 29 September 1978, and a detailed systems checkout is now underway prior to a full start-up of the Test Farm. Compatibility of the Test Farm with the planned transport and attachment procedures of the Macrocystis pyrifera plants has been completed and planting will begin on the full structure during the month of October. Success was also achieved in the Inoculum Development phase of the program with the production of two methane enrichments, one grown on an acetate medium and the other on a mixed acid substrate. These will be used in future mixed inoculum digester studies as an attempt to significantly decrease detention time. (ERA citation 06:005891)

DOE/ET/20041-T1 PC **A05**/MF **A01**
Texas Tech Univ., Lubbock.
Application of SGFM Technology to Alternate Feedstocks. Phase III.
S. R. Beck, R. A. Bartsch, U. Mann, and J. A. Hightower. 1980, 95p
Contract AS04-76ET20041

The Synthesis Gas From Manure (SGFM) pilot plant was constructed at Texas Tech University to evaluate the gasification of cattle feedlot manure. A study of gas yield and composition as a function of operating conditions was performed. This report presents the results of a comparison of feedstocks other than manure in the pilot plant. Oak sawdust was the superior feedstock tested in terms of both gas yield and operability. Corn stover and mesquite were comparable and presented some handling problems. Cotton gin trash was unacceptable due to low-temperature ash fusion in the reactor. The gas yield from oak sawdust varied from 0.8 to 1.7 1/gm DAF feed at average temperatures of 650 to 770 exp 0 C. The gas contained approximately 15% hydrogen and 40% carbon monoxide by volume. It also contained 5 to 8% methane and 2 to 5% ethylene. All of these results were obtained using steam and air as the gasifying medium. (ERA citation 06:005853)

DOE/ET/20041-T2 PC **A05**/MF **A01**
Texas Tech Univ., Lubbock. Dept. of Chemical Engineering.
Kinetic Investigation of Wood Pyrolysis.
F. Thurner, U. Mann, and S. R. Beck. Jun 80, 80p
Contract AS04-76ET20041

The objective of this investigation was to determine the kinetics of the primary reactions of wood pyrolysis. A new experimental method was developed which enabled us to measure the rate of gas, tar, and char production while taking into account the temperature variations during the wood heating up. The experimental method developed did not require any sophisticated instruments. It facilitated the collection of gas, tar and residue (unreacted wood and char) as well as accurate measurement of the temperature inside the wood sample. Expressions relating the kinetic parameters to the measured variables were derived. The pyrolysis kinetics was investigated in the range of 300 to 400 exp 0 C at atmospheric pressure and under nitrogen atmosphere. Reaction temperature and mass fractions of gas, tar, and residue were measured as a function of time. Assuming first-order reactions, the kinetic parameters were deter-

mined using differential method. The measured activation energies of wood pyrolysis to gas, tar, and char were 88.6, 112.7, and 106.5 kJ/mole, respectively. These kinetic data were then used to predict the yield of the various pyrolysis products. It was found that the best prediction was obtained when an integral-mean temperature obtained from the temperature-time curve was used as reaction temperature. The pyrolysis products were analyzed to investigate the influence of the pyrolysis conditions on the composition. The gas consisted mainly of carbon dioxide, carbon monoxide, oxygen, and C sub 3+ -compounds. The gas composition depended on reaction time as well as reactor temperature. The tar analysis indicated that the tar consisted of about seven compounds. Its major compound was believed to be levoglucosan. Elemental analysis for the char showed that the carbon content increased with increasing temperature. (ERA citation 06:005892)

DOE/PC/30088-1 PC **A02**/MF **A01**
Chicago Univ., IL.
Coal Transformation Chemistry. First Quarterly Progress Report, March 1, 1980-May 31, 1980.
L. M. Stock. 1980, 20p
Contract AC22-80PC30088

Considerable progress has been made on the development of a convenient procedure for the alkylation of Illinois No. 6 coal in liquid ammonia. The results are presented in summary in Section IIIB, Task 1 and in more detail in Section IVB. Work on the chemistry of the liquefaction reaction has led to the conclusion that phenolic compounds participate in free radical reactions in hydrogen donor solvents. Phenolic compounds and benzoic acid derivatives do not function as acid catalysts in their reactions with tetralin and other representative compounds. In addition, the reaction of styrene with tetralin at 400 exp 0 C has been shown to be a complex process involving rather deepseated chemical transformations. The results are presented in summary in Section IIIB, Task 3 and in more detail in Section IVC. (ERA citation 06:005682)

FE-2286-48 PC **A99**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Preparation of a Coal Conversion Systems Technical Data Book. Annual Report, May 1, 1978-April 30, 1979.
Sep 80, 664p
Contract AC01-76ET10255

Two correlations of vapor-liquid equilibria in the NH sub 3 -H sub 2 S-H sub 2 O system were tested on experimental data for the system. Correlations of the salting-out coefficients of ammonia, carbon dioxide, and hydrogen sulfide at 25 exp 0 C were developed. The basic, physical, and thermodynamic properties of xylenols and decalins are given. Enthalpies of distillate fractions of various syncrudes are presented and compared with correlations. The combustion characteristics of Solvent-Refined Coal are summarized. A report on the viscosity of slag is presented. Application of IGT's new formula for calculating the heating value of coal to coal chars to new data indicated larger standard deviations than those for the original data bank. The general fundamental design information on fixed (moving) bed coal gasifier is reviewed and the possibility of using a computer model of fixed bed gasification to generate design information is investigated. The problem of carbon deposition in methanators has been reviewed. In gas-solids transport, correlations on pressure drop in dilute-phase pneumatic conveyor and vertical dense-phase transport in lift line are evaluated and compared with the data available in literature. Processes for sulfur recovery in wastewater treatment and hydrocarbon incineration are described. (ERA citation 06:005683)

LASL-80-24(BRIEF) PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Mineral Recovery from US Coals.
N. E. Vanderborgh. Sep 80, 4p
Contract W-7405-ENG-36

This paper proposes that the coal transported in slurry pipelines be chemically processed during transport (transport time = 2 weeks for 1000 miles) to recover the following elements or minerals during transport: titanium, aluminium, germanium, indium, beryllium, zirconium, and barite. High grade ores of these elements are being depleted and extraction from low grade ores is expensive because of the large amounts of rock to be handled. The coal will be mined for fuel and will be available for processing for a reasonable time period and in a suitable form during slurry pipeline transport. (ERA citation 06:001880)

MASEC-TP-80-009 PC **A02**/MF **A01**
Mid-American Solar Energy Complex, Minneapolis, MN.
On-Farm Production of Fuel-Alcohol in Mid-America Technical and Economic Potential.
M. A. Hohmann. Mar 80, 22p CONF-8004124-1
Contract AC02-79CS30150
12. annual meeting of the Mid-Continent Regional Science Association, Lincoln, NB, USA, 24 Apr 1980.

Alcohol fuel production is suggested as an alternative to high energy costs for the Mid-American farmer. The steps involved in producing alcohol from biomass are reviewed. Fermentation equipment and procedures are readily available. The utilization of by-products for animal feeds is discussed. Combustion characteristics and chemical properties of ethanol are reviewed. Estimates are made of costs involved in alcohol production in the mid-west region. Regional agricultural consumption of gasoline is estimated and 3 scenarios are developed. Benefits of on-farm fuel production are outlined. (ERA citation 06:002136)

NP-25191 PC **A03**/MF **A01**
Tennessee Valley Authority, Norris.
Provisional Forest Biomass Statistics for the 201-County Tennessee Valley Region.
Mar 80, 50p
U.S. Sales Only.

Aboveground green weights of biomass (i.e., wood, bark, and foliage) by forest component (i.e., merchantable trees, cull trees, understory, logging residue, and surplus growth) are presented for each county within the 201-county Tennessee Valley Region. Both total and per-acre weights are shown. Total biomass is estimated at nearly 3 billion green tons and averages 95.08 tons per acre of commercial forest. Maximum annual availability of forest biomass (AAB) is estimated to be 51 million green tons, or 1.7% of total biomass. Annual available biomass is defined as the upper limit of total aboveground gross green weight of wood, bark, and foliage that could theoretically be harvested annually for both energy and traditional products in the absence of any physical, socioeconomic, or environmental constraints, other than a 2.0% (annual compound rate) reserved growth for inventory buildup. Data sources, reliability, assumptions, conversion factors, and formulas are discussed. (ERA citation 06:004648)

N81-15069/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Deposition and Material Response from Mach 0.3 Burner Rig Combustion of Src 2 Fuels.
Final rept.,
G. J. Santoro, F. J. Kohl, C. A. Stearns, G. C. Fryburg, and J. R. Johnson. Oct 80, 47p NASA-TM-81634, E-647
Contract EF-77-A-01-2593

Collectors at 1173K (900 C) were exposed to the combustion products of a Mach 0.3 burner rig fueled with various industrial turbine liquid fuels from solvent refined coals. Four fuels were employed: a naphtha, a light oil, a wash solvent and a mid-heavy distillate blend. The response of four superalloys (IN-100, U 700, IN 792 and M-509) to exposure to the combustion gases from the SRC-2 naphtha and resultant deposits was also determined. The SRC-2 fuel analysis and insights obtained during the combustion experience are discussed. Particular problems encountered were fuel instability and reactions of the fuel with hardware components. The major metallic elements which contributed to the deposits were copper, iron, chromium, calcium, aluminum, nickel, silicon, titanium, zinc, and sodium. The deposits were found to be mainly metal oxides. An equilibrium thermodynamic analysis was employed to predict the chemical composition of the deposits. The agreement between the predicted and observed compounds was excellent. No hot corrosion was observed. This was expected because the deposits contained very little sodium or potassium and consisted mainly of the unreactive oxides. However, the amounts of deposits formed indicated that fouling is a potential problem with the use of these fuels.

ORNL/TM-7513 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Stress Corrosion Studies in Solvent Refined Coal Liquefaction Pilot Plants.
V. B. Baylor, J. R. Keiser, M. D. Allen, and E. J. Lawrence. Dec 80, 48p
Contract W-7405-ENG-26

Coal liquefaction plants with 6000 ton/d capacity are currently being planned by DOE as a step toward commercial production of synthetic fossil fuels. These plants will demonstrate the large-scale viability of the Solvent Refined Coal (SRC) process, which has been used since 1974 in two operating pilot plants: a 50-ton/d unit at Fort Lewis, Washington, and a 6-ton/d plant in Wilsonville, Alabama. Experience in these plants has shown that austenitic stainless steels are susceptible to stress corrosion cracking associated with residual stresses from cold working or welding. The corrodents responsible for the cracking have not yet been positively identified but are suspected to include polythionic acids and chlorides. To screen candidate materials of construction for resistance to stress corrosion cracking, racks of stressed U-bend specimens in welded and as-wrought conditions have been exposed at the Wilsonville and Fort Lewis SRC pilot plants. These studies have identified alloys that are suitable for critical plant applications. (ERA citation 06:005674)

ORNL-tr-4676 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Importance of Automation and Process Control for German Coal Preparation.
D. Bartelt, and W. Roesner. 7 Apr 77, 14p
Contract W-7405-ENG-26
A , Glueckauf, 113 P367-372 7 Apr 1977.

Comprehensive automation in coal preparation with the goal of process optimization presupposes an efficient mathematical model and a reliable central process control in on-line operation. The central process control, using a process computer, is based on hierarchically organized automation levels and is presently being tested in the coal preparation plant of the Ewald mine operated by Ruhrkohle AG. Measured data acquisition, the strategy of automation hierarchy and the design examples are important parameters in this system. The industrial testing of the simulation model has just begun. It is therefore not yet possible to obtain any evidence concerning the practical effects of the mathematical model. Central process control with the strategy of hierarchical structure of automation levels, as described above, has proved successful in operation and has fulfilled expectations. Some difficulties still occur in connection with the measuring and regulating units. Process optimization can be implemented, to judge from experience to date, whereby the economic result can be very favorably influenced if the preparation plants have few machines and equipment units with high throughput rates and a simple and logical design. (ERA citation 06:005709)

ORNL-tr-4677 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Mathematical Description of Coal Separation.
K. Koppitz, W. Plate, and W. Simonis. 1979, 17p
Contract W-7405-ENG-26
Translated from Glueckauf-Forschungsh. 40 n4 P171-177 1979.

The separation process is comprehensively described with a specially defined quantity as a function of limiting quantities, since not only classification but also sizing, which occurs simultaneously, is included. In order to represent the functional dependence of the boundary limit and precision of separation, further desired quantities of regression equations are selected: the effective separation size, separation size, and the probably Ecart deviation. The representation of these quantities as a function of effective separating size shows the correlation capability of these quantities. Proof is given that the Ecart deviation is a fnction of the raw material and thus is not suitable on principle as a

specific mechanical characteristic. Of the total of ten critical factors investigated, five can be eliminated as not significant. The significant variables within the limits of the validity range - the operationally relevant range was investigated in 180 individual tests - are the size-density-mineral (ash) distribution of the feed, the surface moisture and the surface characteristic, which are all raw material variables, and the specific volume flow of air and the throughput, as operation-related variables. (ERA citation 06:005704)

PB81-148116 PC **A02**/MF **A01**
Bureau of Mines, Twin Cities, MN. Twin Cities Research Center.
Partial Replacement of Coke in Cupola Operation.
Rept. of investigations/1980,
V. R. Spironello, and W. M. Mahan. 1980, 25p BUMINES-RI-8488

The Bureau of Mines is involved in research directed toward the conservation of important raw materials and the utilization of solid waste. Two of the objectives are to conserve high-quality coking coals used for foundry coke and to utilize waste materials of marginal quality but of high caloric value. These objectives are consistent with Bureau goals. Pilot plant cupola trials were made to evaluate the adequacy of various alternative fuels, and to determine to what extent they could replace the foundry coke in cupola charges. Information was obtained on furnace performance, metal and slag chemistry, environmental questions, and the properties of castings.

PB81-914600 Subscription
Department of Energy, Oak Ridge, TN. Technical Information Center.
Fossil Energy Update.
Monthly repts.
1981, 13 issues
Paper copy or microfiche available on subscription, North American Continent price $45.00/year; single copy price PC$6.00, MF$6.00; all others write for quote. Subscription includes Cumulative Index.

Fossil Energy Update (FEU) provides abstracting and indexing coverage of current scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs from all sources on fossil energy. The subject matter covered by FEU includes coal, petroleum, natural gas, oil shale, hydrogen production, hydrocarbon and alcohol fuels, electric power engineering, and magnetohydrodynamic generators.

21E. Jet and Gas Turbine Engines

AD-A093 516/3 PC **A08**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Maritime Patrol Aircraft Engine Study P&WA Derivative Engines. Volume II. Performance Data.
Final rept. Oct 78-Apr 79,
Richard C. Newell, and Paul W. Herrick. 30 Apr 79, 156p PWA-FR-10966B/C-VOL-2, NADC-79132-60-VOL-2
Contract N62269-78-C-0410
See also Volume 1, AD-B053 733L.

This study develops data on P&W common core derivative engines for use in Maritime Patrol Aircraft (MPA) concept formulation studies. The study included the screening of potential P&W turbofan and turboshaft engines and the preparation of technical and planning information on three of the most promising engine candidates. Screening of P&W derivative candidates was performed utilizing an analytical MPA model using synthesized mission profiles to rank the candidates in terms of specific fuel consumption and take-off gross weight which translates into life cycle cost. The three derivative engines selected for further development were as follows F100 derivative (STS-539), JT10D derivative (STS-538) and JT10D hot rematched derivative (STS-538A). Volume I contains technical data, planning data, drawings, costs, R&M development schedules and weight estimates for each of the three turboshaft engine configurations. Volume II of this report contains the detailed performance data estimates for each of the three turboshaft engine configurations. (Author)

AD-A093 821/7 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Development, Acquisition, and Operating and Support Cost Methods for Aircraft Turbine Engines,
John L. Birkler, and J. R. Nelson. Sep 78, 63p Rept no. RAND/P-6214

The class of engine discussed in this paper is large, man-rated engines that have thrust levels ranging from a few thousand pounds to approximately 50,000 pounds. The development costs can be as much as a half a billion dollars, with unit costs for some in excess of a million dollars.

AD-A093 822/5 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Aircraft Turbine Engine Monitoring Systems: Overview and Lessons Learned from Six Case Studies,
John L. Birkler, and J. R. Nelson. May 79, 34p Rept no. RAND/P-6337
See also Rept. no. RAND/R-2391-AF, AD-A069 282.

This paper reviews the experience gained from several aircraft turbine engine monitoring systems used over the last decade and a half and examines the implications of that experience for recently proposed monitoring systems. Two different approaches to engine monitoring have evolved in attempts to achieve the goals of improved engine operations, maintenance, and management coupled with reduced maintenance costs. The first approach concentrates on day-to-day operations and maintenance concerns and is usually accomplished by recording a few seconds of engine usage data either at predefined performance windows or when certain engine operating limits are exceeded. The second approach focuses on long-term, design-oriented benefits that are gained through improved knowledge of the overall engine operating environment. Much uncertainty still exists about the benefits and cost attributable to engine monitoring systems. We believe that the estimated maintenance cost savings most often used to justify new monitoring system are unlikely to materialize over the short term.

AD-A093 868/8 PC **A05**/MF **A01**
Systems Control, Inc. (VT), Palo Alto, CA.
Multivariable Control Synthesis Program - Control Aspects of the F100 Altitude Demonstration of the Multivariable Control System.
Ronald L. DeHoff, Stephen Rock, W. Earl Hall, and Richard J. Adams. Mar 80, 83p AFWAL-TR-80-2010
Contract F33615-75-C-2053
See also Rept. nos. AFAPL-TR-77-35-VOL-1, AD-A052 420 and AFAPL-TR-77-35-VOL-2, AD-A052 346.

This report describes the engine test demonstration phase of the F100 multivariable control synthesis program. Details of the control system design procedure and results of the hybrid simulation tests are described in AFAPL-TR-77-35, Volumes I and II. The analytical design of the F100 multivariable control system included a validation of the controller performance using a hybrid simulation. The hybrid simulation represented an 'average' F100 turbofan engine and assumed a one-dimensional flow path. Of course, real engine test hardware, which includes the engine, sensing, and control actuator hardware, will behave differently. These differences are recognized by the control designers and, prior to extensive testing at critical design points, these differences and their impact on the controller performance must be quantified. This report describes the results of the activities to determine the base line engine and sensor/actuator hardware performance. The validation of the engine reference point and trim schedules are included. An analysis of the Delta P/P (Fan exit Mach number) instrumentation, the response characteristics of the basic fuel delivery system, and the contributions due to the response rate of the test facility are presented. (Author)

AD-A093 953/8 PC **A04**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Prediction and Evaluation of Thrust Augmenting Ejector Performance at the Conceptual Design Stage.
Final rept. Oct 78-Sep 79,
K. A. Green. 30 Apr 80, 58p Rept no. NADC-80094-60

The performance characteristics of thrust augmenting ejectors, based on a computerized one-dimensional analysis technique, are shown. Various loss mechanisms within the ejector are described and the sensitivity of the ejector performance to these loss mechanisms are illustrated. Performance estimates have been made for several ejector configurations for which experimental data are available. Despite the assumptions that have to be made, in order that the problem be tractable for the one dimensional analysis, good agreement between the predicted and experimental values have been obtained. Other more complex (2 D and 3 D) codes have also been examined but were found to be expensive to run and in some cases limited in application. (Author)

AD-A093 958/7 PC **A05**/MF **A01**
General Motors Corp., Indianapolis, IN. Detroit Diesel Allison Div.
GMA200 ATEGG Digital Controls Demonstration.
Final test rept. Jan 77-Sep 78,
D. E. Warner, K. A. Pieper, and F. J. O'Keefe. Oct 79, 97p DDA-EDR-9586, AFAPL-TR-78-97
Contract F33657-76-C-0021

This report describes the results of the closed-loop, on engine test of the Bendix EH-K1 digital controller on Build 5 of the Advanced Technology Engine Gas Generator (ATEGG). Control modes are described with emphasis on changes to be incorporated on ATEGG Build 6. The control mode changes include simplification of the fuel governor structure, modification of the fuel splitter logic to aid main fuel system light-off, and modification of the fuel limiting logic to prevent transient overshoots of critical engine parameters. Off-engine testing of the controller with the ATEGG fuel system is discussed. Fuel system characteristics were analyzed and adjusted to yield tighter control of engine fuel flow. The Build 5 test stand set-up and instrumentation are described, along with testing accomplished and data correlation. The open loop operation of the controller was successfully demonstrated, and data correlation with test stand values was satisfactory. Successful closed loop digital control operation was exercised at the end of Build 5 engine testing. (Author)

N81-14972/6 PC **A10**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Investigation of Convergent-Divergent Nozzles Applicable to Reduced-Power Supersonic Cruise Aircraft.
B. L. Berrier, and R. J. Re. Dec 80, 218p NASA-TP-1766, L-13974

An investigation was conducted of isolated convergent-divergent nozzles to determine the effect of several design parameters on nozzle performance. Tests were conducted using high pressure air for propulsion simulation at Mach numbers from 0.60 to 2.86 at an angle of attack of 0 deg and at nozzle pressure ratios from jet off to 46.0. Three power settings (dry, partial afterburning, and maximum afterburning), three nozzle lengths, and nozzle expansion ratios from 1.22 to 2.24 were investigated. In addition, the effects of nozzle throat radius and a cusp in the external boattail geometry were studied. The results of this study indicate that, for nozzles operating near design conditions, increasing nozzle length increases nozzle thrust-minus-drag performance. Nozzle throat radius and an external boattail cusp had negligible effects on nozzle drag or internal performance.

N81-14978/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Supersonic Stall Flutter of High Speed Fans.
J. J. Adamczyk, W. Stevens, and R. Jutras. 1981, 15p NASA-TM-81613, E-612

Proposed for Presentation at 26TH Ann. Intern. Gas Turbine Conf., Houston, 8-12 Mar. 1981; Sponsored by AM. Soc. Of Mechan. Engr.

An analytical model is developed for predicting the onset of supersonic stall bending flutter in axial flow compressors. The analysis is based on a modified two dimensional, compressible, unsteady actuator disk theory. It is applied to a rotor blade row by considering a cascade of airfoils whose geometry and dynamic response coincide with those of a rotor blade element at 85 percent of the span height (measured from the hub). The rotor blades are assumed to be unshrouded (i.e., free standing) and to vibrate in their first flexural mode. The effects of shock waves and flow separation are included in the model through quasi-steady, empirical, rotor total-pressure-loss and deviation-angle correlations. The actuator disk model predicts the unsteady aerodynamic force acting on the cascade blading as a function of the steady flow field entering the cascade and the geometry and dynamic response of the cascade. Calculations show that the present model predicts the existence of a bending flutter mode at supersonic inlet Mach numbers. This flutter mode is suppressed by increasing the reduced frequency of the system or by reducing the steady state aerodynamic loading on the cascade. The validity of the model for predicting flutter is demonstrated by correlating the measured flutter boundary of a high speed fan stage with its predicted boundary. This correlation uses a level of damping for the blade row (i.e., the log decrement of the rotor system) that is estimated from the experimental flutter data. The predicted flutter boundary is shown to be in good agreement with the measured boundary.

N81-14979/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Solution of Plane Cascade Flow Using Improved Surface Singularity Methods.
E. R. Mcfarland. 1981, 14p NASA-TM-81589, E-568
Presented for Presentation at 26TH Ann. Intern. Gas Turbine Conf., Houston 8-12 Mar. 1981; Sponsored by AM. Soc. Of Mech. Engr.

A solution method was developed for calculating compressible inviscid flow through a linear cascade of arbitrary blade shapes. The method uses advanced surface singularity formulations which were adapted from those in current external flow analyses. The resulting solution technique provides a fast flexible calculation for flows through turbomachinery blade rows. The solution method and some examples of the method's capabilities are presented.

N81-14980/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Full Potential Solution of Transonic Quasi-3-D Flow Through a Cascade Using Artificial Compressability.
C. Farrell, and J. Adamczyk. 1981, 40p NASA-TM-81637, E-574
Presented at 26TH Ann. Intern. Gas Turbine Conf., Houston, Tex., 8-12 Mar. 1981; Sponsored by Asme.

The three-dimensional flow in a turbomachinery blade row was approximated by correcting for streamtube convergence and radius change in the throughflow direction. The method is a fully conservative solution of the full potential equation incorporating the finite volume technique on body fitted periodic mesh, with an artificial density imposed in the transonic region to insure stability and the capture of shock waves. Comparison of results for several supercritical blades shows good agreement with their hodograph solutions. Other calculations for these profiles as well as standard NACA blade sections indicate that this is a useful scheme analyzing both the design and off-design performance of turbomachinery blading.

N81-15000/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Edwards, CA. Hugh L. Dryden Flight Research Center.
Flight Evaluation of a Simplified Gross Thrust Calculation Technique Using an F100 Turbofan Engine in an F-15 Airplane.
F. J. Kurtenbach, and F. W. Burcham, Jr.. Jan 81, 21p NASA-TP-1782, H-1118

A simplified gross thrust calculation technique was evaluated in flight tests on an F-15 aircraft using prototype F100-PW-100 engines. The technique relies on afterburner duct pressure measurements and empirical corrections to an ideal one-dimensional analysis to determine thrust. In-flight gross thrust calculated by the simplified method is compared to gross thrust calculated by the engine manufacturer's gas generator model. The evaluation was conducted at Mach numbers from 0.6 to 1.5 and at altitudes from 6000 meters to 13,700 meters. The flight evaluation shows that the simplified gross thrust method and the gas generator method agreed within plus or minus 3 percent. The discrepancies between the data generally fell within an uncertainty band derived from instrumentation errors and recording system resolution.

N81-15001/3 PC **A06**/MF **A01**
Purdue Univ., Lafayette, IN. School of Mechanical Engineering.
Application of the Mna Design Method to a Nonlinear Turbofan Engine.
Final rept.,
G. Leininger. Jan 81, 107p NASA-CR-163855
Grant NSG-3171

Using nonlinear digital simulation as a representative model of the dynamic operation of the QCSEE turbofan engine, a feedback control system is designed by variable frequency design techniques. Transfer functions are generated for each of five power level settings covering the range of operation from approach power to full throttle (62.5% to 100% full power). These transfer functions are then used by an interactive control system design synthesis program to provide a closed loop feedback control using the multivariable Nyquist array and extensions to multivariable Bode diagrams and Nichols charts.

N81-15002/1 PC **A04**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Energy Efficient Engine Diffuser/Combustor Model Technology.
W. Gardner. Jun 80, 62p NASA-CR-165157, PWA-5594-122
Contract NAS3-20646

A full scale, full annular diffuser/combustor model test rig was tested to investigate how configurational changes affect pressure loss and flow separation characteristics. The rig was characterized by five major modules: inlet; prediffuser; strut; simulated combustor; and full combustor. The prediffuser featured a short, curved wall dump design. Performance goals included: (1) a separation-free prediffuser flow field; (2) total pressure loss limited to 3.0 percent in the prediffuser and shrouds; and (3) an overall section pressure loss of 5.5 percent P sub T3 at the design airflow distribution. The results indicated that the prediffuser configurations operate well within the program goals for pressure loss and demonstrate separation free operation over a wide range of inlet conditions.

N81-15004/7 PC **A08**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Aerodynamic Stability Analysis of NASA J85-13/Planar Pressure Pulse Generator Installation.
K. Chung, W. M. Hosny, and W. G. Steenken. Nov 80, 168p NASA-CR-165141, R80AEG429
Contract NAS3-21259

A digital computer simulation model for the J85-13/Planar Pressure Pulse Generator (P3 G) test installation was developed by modifying an existing General Electric compression system model. This modification included the incorporation of a novel method for describing the unsteady blade lift force. This approach significantly enhanced the capability of the model to handle unsteady flows. In addition, the frequency response characteristics of the J85-13/P3G test installation were analyzed in support of selecting instrumentation locations to avoid standing wave nodes within the test apparatus and thus, low signal levels. The feasibility of employing explicit analytical expression for surge prediction was also studied.

N81-15005/4 PC **A05**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
TF34 Engine Compression System Computer Study.
W. M. Hosny, and W. G. Steenken. Jun 79, 93p NASA-CR-159889, R78AEG612
Contract NAS3-20599

The stability of the fan and the compressor components was examined individually using linearized and time dependent, one dimensional stability analysis techniques. The stability of the fan core integrated compression system was investigated using a two dimensional compression system model. The analytical equations on which this model was based satisfied the mass, axial momentum, radial momentum, and energy conservation equations for flow through a finite control volume. The results gave an accurate simulation of the flow through the compression system. The speed lines of the components were reproduced; the points of instability were accurately predicted; the locations where the instability was initiated in the fan and the core were indicated; and the variation of the bypass ratio during flow throttling was calculated. The validity of the analytical techniques was then established by comparing these results with test data and with results obtained from the steady state cycle deck.

N81-15006/2 PC **A03**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
Cost/Benefit Analysis of Advanced Materials Technologies for Future Aircraft Turbine Engines.
Final rept.,
G. E. Stephens. Aug 80, 49p NASA-CR-165225, PWA-5755
Contract NAS3-20072

The materials technologies studied included thermal barrier coatings for turbine airfoils, turbine disks, cases, turbine vanes and engine and nacelle composite materials. The cost/benefit of each technology was determined in terms of Relative Value defined as change in return on investment times probability of success divided by development cost. A recommended final ranking of technologies was based primarily on consideration of Relative Values with secondary consideration given to changes in other economic parameters. Technologies showing the most promising cost/benefits were thermal barrier coated temperature nacelle/engine system composites.

N81-15240/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Factors Which Influence the Behavior of Turbofan Forced Mixer Nozzles.
B. H. Anderson, and L. A. Povinelli. 1981, 30p NASA-TM-81668, E-689
Prepared for 19TH Aerospace Sci. Meeting, St. Louis, 12-15 Jan. 1981; Sponsored by Aiaa.

A finite difference procedure was used to compute the mixing for three experimentally tested mixer geometries. Good agreement was obtained between analysis and experiment when the mechanisms responsible for secondary flow generation were properly modeled. Vorticity generation due to flow turning and vorticity generated within the centerbody lobe passage were found to be important. Results are presented for two different temperature ratios between fan and core streams and for two different free stream turbulence levels. It was concluded that the dominant mechanisms in turbofan mixers is associated with the secondary flows arising within the lobe region and their development within the mixing section.

N81-15768/7 PC **A07**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Analysis of Pressure Spectra Measurements in a Ducted Combustion System.
Ph.D. Thesis - Toledo Univ.
J. H. Miles. Nov 80, 138p NASA-TM-81583, E-558

Combustion noise propagation in an operating ducted liquid fuel combustion system is studied in relation to the development of combustion noise prediction and suppression techniques. The presence of combustor emissions in the duct is proposed as the primary mechanism producing the attenuation and dispersion of combustion noise propagating in an operating liquid fuel combustion system. First, a complex mathematical model for calculating attenuation and dispersion taking into account mass transfer, heat transfer, and viscosity effects due to the presence of liquid fuel droplets or solid soot particles is discussed. Next, a simpler single parameter model for calculating pressure auto-spectra and cross-spectra which takes into account dispersion and attenuation due to heat transfer between solid soot particles and air is developed. Then, auto-spectra and cross-spectra obtained from internal pressure measurements in a combustion system consisting of a J-47 combustor can, a spool piece, and a long duct are presented. Last, analytical results obtained with the single parameter model are compared with the experimental measurements. The single parameter model results are shown to be in excellent agreement with the measurements.

N81-15769/5 PC **A09**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
Improved Methods for Fan Sound Field Determination.
D. E. Cicon, T. G. Sofrin, and D. C. Mathews. Jan 81, 180p NASA-CR-165188, PWA-5635-43
Contract NAS3-21391

Several methods for determining acoustic mode structure in aircraft turbofan engines using wall microphone data were studied. A method for reducing data was devised and implemented which makes the definition of discrete coherent sound fields measured in the presence of engine speed fluctuation more accurate. For the analytical methods, algorithms were developed to define the dominant circumferential modes from full and partial circumferential arrays of microphones. Axial arrays were explored to define mode structure as a function of cutoff ratio, and the use of data taken at several constant speeds was also evaluated in an attempt to reduce instrumentation requirements. Sensitivities of the various methods to microphone density, array size and measurement error were evaluated and results of these studies showed these new methods to be impractical. The data reduction method used to reduce the effects of engine speed variation consisted of an electronic circuit which windowed the data so that signal enhancement could occur only when the speed was within a narrow range.

21G. Reciprocating Engines

N81-15003/9 PC **A04**/MF **A01**
Spectron Development Labs., Inc., Costa Mesa, CA.
Fuel Injector Characterization Studies.
Final rept.,
M. J. Houser, and W. D. Bachalo. Oct 80, 54p NASA-CR-165200, SDL-80-2122-13F
Contract NAS3-21288

The atomization of several general aviation piston engine manifold port fuel injectors was investigated. The injectors were installed in a test rig and operated under simulated conditions. Laser interferometric techniques were used to optically probe the spray droplet fields for droplet size and velocity at numerous spatial locations throughout the field.

N81-15241/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
A Four-Cylinder Stirling Engine Controls Model.
C. F. Lorenzo, and C. J. Daniele. 1980, 25p NASA-TM-81648, E-9356-7
Contract DE-AI01-77CS-51040
Presented at Automotive Technol. Develop. Contractor Coordination Meeting, Dearborn, Mich., 11-13 Nov. 1980.

A four working space, double acting piston, Stirling engine simulation was developed for controls studies. Two simulations, one for detailed fluid behavior, and a second model with simple fluid behavior but containing the four working space aspects and engine inertias, validate these models separately, then upgrade the four working space model by incorporating the detailed fluid behavior model for all four working spaces. The single working space model contains the detailed fluid dynamics. The four working space (FWS) model was built to observe the behavior of the whole engine. The drive dynamics and vehicle inertia effects are simulated. The capabilities of the model are exercised to look at working fluid supply transients, short circuit transients, and piston ring leakage effects.

PB81-141681 PC **A03**/MF **A01**
Statens Vaeg- och Trafikinstitut, Linkoeping (Sweden).
Anvaendning av Elektrisk Motorvaermare - Inverkan pae Braenslefoerbrukningen vid Kallstart (The Use of Electric Engine Heaters - Influence on Cold Start Fuel Consumption),
Olle Odsell. 1980, 42p VTI-190
Abstract and Summary in Swedish and English. Text in Swedish. Also pub. as ISSN 0347-6030.

The report describes how much excess fuel that is consumed by cars when starting from cold, and how the fuel consumption is influenced by the use of an electric engine heater before start. Tests have been made with two cars in temperatures between -18C and +3C. On the basis of the results some recommendations are given concerning heating-time in different ambient temperatures. Finally some calculations are made of the balance between fuel savings and costs for electric energy, from both a private economy and a national economy point of view.

PB81-851206 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Exhaust systems for Internal Combustion Engines. January, 1970-October, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Oct 80.
Oct 80, 230p

The citations cover the following exhaust systems: diesel engines, automobile engines, gas-turbines, two-stroke engines, aircraft engines, and earth-moving equipment. Particle exhaust systems and catalytic effects on exhaust pipes are also included. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-851214 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Exhaust Systems for Internal Combustion Engines. January, 1976-October, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Oct 80.
Oct 80, 195p

The citations from worldwide literature cover the following exhaust systems: diesel engines, automobile engines, gas-turbines, two-stroke engines, aircraft engines, and earth-moving equipment. Particle exhaust systems and catalytic effects on exhaust pipes are also included. (Contains 194 citations, fully indexed and including a table of contents.)

PB81-851222 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Exhaust Systems for Internal Combustion Engines. January, 1970-October, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Oct 80.
Oct 80, 198p

The citations from worldwide literature cover the following exhaust systems: diesel engines, automobile engines, gas-turbines, two-stroke engines, aircraft engines, and earth-moving equipment. Particle exhaust systems and catalytic effects on exhaust pipes are also included. (Contains 199 citations, fully indexed and including a table of contents.)

PB81-851230 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Exhaust Systems for Internal Combustion Engines. January, 1972-October, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Oct 80.
Oct 80, 102p NERACIAANT1668

The citations from worldwide literature cover the following exhaust systems: diesel engines, automobile engines, gas-turbines, two-stroke engines, aircraft engines, and earth-moving equipment. Particle exhaust systems and catalytic effects on exhaust pipes are also included. (Contains 89 citations, fully indexed and including a table of contents.)

21H. Rocket Motors and Engines

N81-15017/9 PC **A04**/MF **A01**
Louisville Univ., KY.
Rotordynamics Analysis for the Hpftp (High Pressure Fuel Turbopump) of the Ssme (Space Shuttle Main Engine). Ssme Turbopump Technology Improvements Via Transient Rotordynamics Analysis.
Final rept.,
D. W. Childs. 30 Jul 80, 63p NASA-CR-161620
Contract NAS8-31233

The results of both linear (stability and synchronous response) and transient nonlinear analyses are reported. Dynamic coefficients were developed for the HPFTP interstage seals, and introduced into the rotordynamic model. The influence on HPFTP rotordynamics of a change in interstage seals from the smooth stepped design to a smooth straight configuration was examined. The sensitivity of the stability and synchronous results to changes in bearing stiffnesses and damping was determined. The influence on rotordynamic stability of a change from the stiff symmetric bearing carrier design to an asymmetric bearing carrier configuration was also studied.

N81-15018/7 PC **A04**/MF **A01**
Aerojet Liquid Rocket Co., Sacramento, CA.
Orbit Transfer Vehicle (Otv) Advanced Expander Cycle Engine Point Design Study. Volume 1: Executive Summary.
Final rept.,
J. A. Mellish. 10 Dec 80, 68p NASA-CR-161621, REPT-33574-F
Contract NAS8-33574

Engine control techniques were established and new technology requirements were identified. The designs of the components and engine were prepared in sufficient depth to calculate engine and component weights and envelopes, turbopump efficiencies and recirculation leakage rates, and engine performance. Engine design assumptions are presented along with the structural design criteria.

N81-15019/5 PC **A16**/MF **A01**
Rocketdyne, Canoga Park, CA.
Orbit Transfer Vehicle Advanced Expander Cycle Engine Point Design Study. Volume 2: Study Results.
H. G. Diem. 12 Dec 80, 365p NASA-CR-161622, RI/RD80-218-2
Contract NAS8-33568

The design characteristics of the baseline engine configuration of the advanced expander cycle engine are described. Several aspects of engine optimization are considered which directly impact the design of the baseline thrust chamber. Four major areas of the power cycle optimization are emphasized: main turbine arrangement; cycle engine source; high pressure pump design; and boost pump drive.

N81-15020/3 PC **A03**/MF **A01**
Aerojet Liquid Rocket Co., Sacramento, CA.
Orbit Transfer Vehicle (Otv) Advanced Expander Cycle Engine Point Design Study. Task 7: Engine Data Summary.
Final rept.,

K. L. Christensen. 1 Oct 80, 50p NASA-CR-161623, REPT-33574-T7
Contract NAS8-33574

A performance optimized engine system design for a man-rated advanced LOX/hydrogen expander cycle engine was investigated. The data are presented in tables, figures, and drawings. The following categories of data for the advanced expander cycle engine are presented: engine operating specification and pressure schedule; engine system layout drawing; major component layout drawings, including thrust chamber and nozzle, extendible nozzle actuating mechanism and seal, LOX turbopump, LOX boost pump, hydrogen turbopump, hydrogen boost pump, and propellant control valves; engine performance and service life prediction; engine weight; and engine envelope. The data represent updates based upon current results from the design and analyses tasks performed under contract. Futher iterations in the designs and data can be expected as the advanced expander cycle engine design matures.

21I. Rocket Propellants

AD-A093 848/0 PC **A02**/MF **A01**
Lehigh Univ., Bethlehem, PA. Dept. of Chemistry.
Fluoro-Epoxies as Grinding Aids and Water-Resistant Coupling Agents for Ultrafine Ammonium Perchlorate Powders,
Frederick M. Fowkes. 22 Dec 80, 8p ARO-17086.1-C
Contract DAAG29-79-C-0207

Highly fluorinated epoxy resins, cured with silicone diamines, have been adsorbed from Freon liquids onto ammonium sulfate (a model for ammonium perchlorate) and cured in place as cross-linked monolayers which can be bonded into the urethane rubber matrix. These materials are found to be excellent grinding aids, allowing a ten-fold reduction in particle size compared to present grinding aids. The stability of surface area when stored in humidity chambers was not bad; two batches stored at 51% relative humidity for six weeks retained 30 square meters per gram with a coating of 2.2 mg/sq. meter, or 1.5 monolayers. (Author)

AD-A093 864/7 PC **A06**/MF **A01**
Ogden Air Logistics Center, Hill AFB, UT. Propellant Analysis Lab.
Propellant Surveillance Report LGM-30 A & B Stage I, TP-H1011.
Semi-annual rept.,
John A. Thompson. Nov 80, 112p Rept no. MAKPH-448(80)

This report contains propellant test results from cartons of TP-1011 bulk propellant representing LGM-30 A and B First Stage Minuteman Motors. Testing was accomplished in accordance with MMWRBM Project M04046C-WNL01529. The purpose of testing was to determine and provide early warning of any serious degradation trends occurring in the propellant for service life predictions. An analysis of all parameters indicates that no potential problems are expected in the propellant for at least two years past the oldest data point. Data stored in the G085 System were plotted utilizing the IBM 360-65 Computer and CAL-COMP Plotter. The data range at any age can be found by suitable inquiry of the G085 System. Each point on the regression plot represents the mean of all samples at that particular age. The number of specimens at each point is indicated on the sample size summary sheet accompanying each regression plot or group of regression plots. (Author)

N81-15120/1 PC **A04**/MF **A01**
Aerojet Liquid Rocket Co., Sacramento, CA.
Photographic Combustion Characterization of LOX/Hydrocarbon Type Propellants.
Final Summary rept.,
D. C. Judd. 15 Aug 80, 55p NASA-CR-160901, MA-262T
Contract NAS9-15724
Original Contains Color Illustrations.

One hundred twenty-seven tests were conducted over a chamber pressure range of 125-1500 psia, a fuel temperature range of -245 F to 158 F, and a fuel velocity range of 48-707 ft/sec to demonstrate the advantages and limitations of using high speed photography to identify potential combustion anomalies such as pops, fuel freezing, reactive stream separation and carbon formations. Combustion evaluation criteria were developed to guide selection of the fuels, injector elements, and operating conditions for testing. Separate criteria were developed for fuel and injector element selection and evaluation. The photographic test results indicated conclusively that injector element type and design directly influence carbon formation. Unlike spray fan, impingement elements reduce carbon formation because they induce a relatively rapid near zone fuel vaporization rate. Coherent jet impingement elements, on the other hand, exhibit increased carbon formation.

22. SPACE TECHNOLOGY

22A. Astronautics

N81-15011/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Kosmos-1129 Biosatellite.
S. A. Nikitin. Aug 80, 4p NASA-TM-76344
Contract NASW-3199
Transl. Into English from Priroda (USSR), No. 2, Feb. 1980 p 103. Transl. By Kanner (Leo), Associates, Redwood City, Calif.

A number of experiments, designed by participating specialists from several countries, are described. The experiments included studies in biorhythm, stress, body parts, behavior, ontogenesis, and gravitational preference. The biological subjects of the experiments were retrieved immediately after the landing of the satellite and examined in a field laboratory.

N81-15012/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Main Results of the Experiments Conducted During the Flight of the Kosmos-1129 Biosatellite and the Status of Preparation of Studies on the Next Biosatlilte.
E. A. Ilin. Dec 80, 22p NASA-TM-76467
Contract NASW-3199
Transl. Into English of Conf. Paper from the Inst. Of Medical and Biological Problems, Ministry of Health USSR (Moscow), 1980 22 p. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Presented at the 11TH Joint Soviet-AM. Working Group on Space, Biol. And Med., Moscow, Oct. 1980.

Experiments included studies on the biological effects of weightlessness. Space flight stress, disorientation, and physiological factors are discussed for each experimental subject. The subjects included rats, drosophila flies, and plants. Metabolic rates were monitored along with other changes in the subject's activity cycles.

22B. Spacecraft

N81-14961/9 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Determination of the Hypersonic-Continuum/Rarefied-Flow Drag Coefficient of the Viking Lander Capsule 1 Aeroshell from Flight Data.
R. C. Blanchard, and G. D. Walberg. Dec 80, 60p NASA-TP-1793, L-14042

Results of an investigation to determine the full scale drag coefficient in the high speed, low density regime of the Viking lander capsule 1 entry vehicle are presented. The principal flight data used in the study were from onboard pressure, mass spectrometer, and accelerometer instrumentation. The hypersonic continuum flow drag coefficient was unambiguously obtained from pressure and accelerometer data; the free molecule flow drag coefficient was indirectly estimated from accelerometer and mass spectrometer data; the slip flow drag coefficient variation was obtained from an appropriate scaling of existing experimental sphere data. Comparison of the flight derived drag hypersonic continuum flow regime except for Reynolds numbers from 1000 to 100,000, for which an unaccountable difference between flight and ground test data of about 8% existed. The flight derived drag coefficients in the free molecule flow regime were considerably larger than those previously calculated with classical theory. The general character of the previously determined temperature profile was not changed appreciably by the results of this investigation; however, a slightly more symmetrical temperature variation at the highest altitudes was obtained.

N81-15015/3 PC **A03**/MF **A01**
Remtech, Inc., Huntsville, AL.
STS-1 Nominal Cycle 3 March/April Launch, Ascent Base Convective Heating Environments.
Final rept.,
R. L. Bender, Jr., and Y. C. Lee. 24 Nov 80, 50p NASA-CR-161629
Contract NAS8-33725

Ascent base convective heating environments were determined for the nominal ascent trajectory for the STS-1 Cycle 3 March/April launch period. Both first and second stage environments are defined for all base heating DFI locations and design body points of interest. An identical format to the STS-1 dispersed trajectory environment was followed throughout. As expected, STS-1 nominal environments are generally less severe than those determined for the high loft and low loft dispersed trajectory conditions. The reduction in cold wall heating with the nominal trajectory varies for each base location analyzed, but, in general, was approximately twenty percent.

N81-15155/7 PC **A06**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Preliminary Design Trade-Offs for a Multi-Mission Stored Cryogen Cooler.
Final rept.,
A. Sherman. Dec 78, 102p NASA-CR-160072, LMSC-D630389
Contract NAS5-24287

Preliminary design studies were performed for a multi-mission solid cryogen cooler having a wide range of application for both the shuttle sortie and free flyer missions. This multi-mission cooler (MMC) is designed to be utilized with various solid cryogens to meet a wide range of instrument cooling from 10 K (with solid hydrogen) to 90 K. The baseline cooler utilizes two stages of solid cryogen and incorporates an optional, higher temperature third stage which is cooled by either a passive radiator or a thermoelectric cooler. The MMC has an interface which can accommodate a wide variety of instrument configurations. A shrink fit adapter is incorporated which allows a drop-in instrument integration. The baseline design provides cooling of approximately 1 watt over a 60 to 100 K temperature range and about 0.5 watts from 15 to 60 K for a one year lifetime. For low cooling loads and with use of the optional radiator shield, cooling lifetimes as great as 8 years are predicted.

N81-15365/2 PC **A10**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Development of Assembly and Joint Concepts for Erectable Space Structures.
Final rept.,

G. G. Jacquemin, R. M. Bluck, G. H. Grotbeck, and R. R. Johnson. Dec 80, 204p NASA-CR-3131
Contract NAS1-15240

The technology associated with the on-orbit assembly of tetrahedral truss platforms erected of graphite epoxy tapered columns is examined. Associated with the assembly process is the design and fabrication of nine member node joints. Two such joints demonstrating somewhat different technology were designed and fabricated. Two methods of automatic assembly using the node designs were investigated, and the time of assembly of tetrahedral truss structures up to 1 square km in size was estimated. The effect of column and node joint packaging on the Space Shuttle cargo bay is examined. A brief discussion is included of operating cost considerations and the selection of energy sources. Consideration was given to the design assembly machines from 5 m to 20 m. The smaller machines, mounted on the Space Shuttle, are deployable and restowable. They provide a means of demonstrating the capabilities of the concept and of erecting small specialized platforms on relatively short notice.

22C. Spacecraft Trajectories and Reentry

AD-A093 554/4 PC **A06**/MF **A01**
Aerospace Defense Command, Peterson AFB, CO. Office of Astrodynamics.
Models for Propagation of NORAD Element Sets.
Spacetrack rept. no. 3,
Felix R. Hoots, and Ronald L. Roehrich. Dec 80, 104p

General perturbations element sets generated by NORAD can be used to predict position and velocity or Earth-orbiting objects. To do this one must be careful to use a prediction method which is compatible with the way in which the elements were generated. Equations for five compatible models are given here along with corresponding FORTRAN IV computer code. With this information a user will be able to make satellite predictions which are completely compatible with NORAD predictions. (Author)

N81-15010/4 PC **A04**/MF **A01**
Computer Sciences Corp., Silver Spring, MD.
Catalog of Double Lunar Swingby Orbits for Exploring the Earth's Geomagnetic Tail.
D. W. Dunham, and S. A. Davis. Oct 80, 57p
NASA-CR-160066, CSC/TM-80/6322
Contract NAS5-24300

Forty three orbits, which are periodic in geocentric reference frames rotating at lunar and at solar rates were found using a patched conic technique. The different orbits provide coverage of different parts of the distant geomagnetic tail. The parameters for 43 sun synchronous double lunar swingby orbits and plots of the sun synchronous double lunar swingby orbits are included.

N81-15014/6 PC **A04**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Study of Systematic Errors in Horizon Sensors Onboard 3-Axes Stabilized, Low Earth Satellites Due to Variations in Earth's Infrared Radiation.
P. Padmanabhan, R. Stapf, and J. Puls. Apr 80, 67p DFVLR-FB-80-24

The sensor's operation principle, the simulation procedure, the mathematical modelling and the computer program are explained. The test results for a 900 km altitude circular and polar orbit are presented. The results show that the sign and magnitude of the sensor errors vary with satellite position and season. The maximum errors in pitch and roll are 0.06 and 0.03 degrees for the edge scanner sensor. The pitch error for a 2 deg field of view (FOV) analogue sensor is 0.12 deg. The size of the FOV affects the energy balance sensor but not the edge scanner sensor.

22D. Spacecraft Launch Vehicles and Ground Support

AD-A093 744/1 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Measuring the Impact of Launch Operations upon Satellite Effectiveness.
interim rept.,
Bruce E. Krell. Jun 80, 68p Rept no. RAND/N-1528-AF
Contract F49620-77-C-0023
See also Rept. no RAND/N-1295-AF, AD-A081 859.

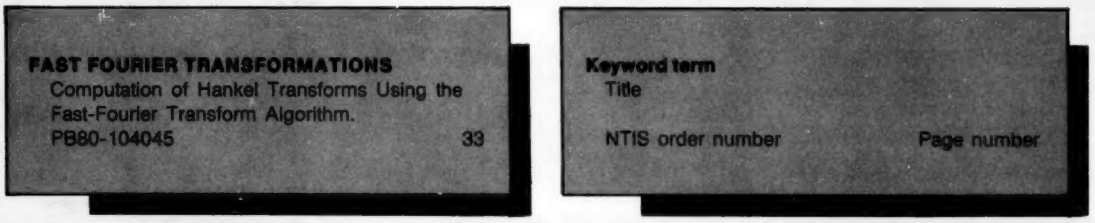
Procurement decisions regarding Department of Defense satellite systems are usually based upon the assumption of a reliable and dependable launch system. Attempts to relate disruptions of launch operations to numbers of satellites on-orbit are often in the form of discrete-event simulations (requiring significant numbers of data inputs and large amounts of computer time). (The approach which is adopted in this study is a form of continuous simulation (as opposed to discrete-event simulation), an approach which has traditionally been limited to analysis of systems in the physical sciences. The continuous simulation methodology requires significantly fewer inputs than discrete-event simulations and is amenable to being implemented on a programmable, hand-held calculator, saving expensive computer and data-gathering time. Several examples are provided which demonstrate how continuous simulation may be used to model disruptions in launch capability and various satellite operational philosophies. (Author)

KEYWORD INDEX

NTIS®

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

SAMPLE ENTRY



A CODES
ANDOSE: A Computer Code for Calculating Annual Doses to Man from Routine Releases of LWR Effluents for the Purpose of Evaluating Compliance with JAEC'S Guide for Dose Objectives.
JAERI-M-8481 2176

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Controlled Burnout of Wasted Coal on Abandoned Coal Mine Lands.
PB81-148231 2238

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Process for the Manufacture of Blood Compatible Sorbents for Extracting Exogenous and Endogenous Poisons--Translation.
AD-A093 763/1 2155

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PB81-147431 2273

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AD-A093 709/4 2123

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Site Symmetry of Surface Adsorbed Molecules.
AD-A093 804/3 2184

Temperature-Compensated High-Resolution Infrared Absorption Spectroscopy: Application to Carbon Monoxide.
AD-A094 004/9 2186

ABSTRACTS
Microvascular Research: Abstracts of the World Congress for Microcirculation (2nd). Volume 17, Number 3, Part 2.
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Industrial Program, Grants and Awards 1973-1979.
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ACCELERATION TOLERANCE
Effects of Centrifugation on Gonadal and Adrenocortical Steroids in Rats.
N81-15663/0 2177

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PB81-151250 2160

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N81-15014/6 2302

ACETAMIDE/DIMETHYL
Information Profiles on Potential Occupational Hazards. Volume I. Single Chemicals. N,N-Dimethyl Acetamide.
PB81-148009 2171

ACETYLCHOLINE
Reprint: Modulatory Effect of Brain Acetylcholine on Reflex-Induced Bradycardia and Tachycardia in Conscious Rats.
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ACID ELECTROLYTE FUEL CELLS
Study of Fuel Cell on-Site, Integrated Energy Systems in Residential/Commercial Applications.
DOE/NASA/0089-80/1 2213

ACIDIFICATION
Responses of Freshwater Plants and Invertebrates to Acidification.
BNL-28534 2164

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Analysis of Pressure Spectra Measurements in a Ducted Combustion System.
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ACOUSTIC CHANNELS
Reprint: Properties for Inverse Analysis of Sound Propagation in Simple Oceanic Waveguides.
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ACOUSTIC EQUIPMENT
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Reprint: Acoustic Environment of the Hatteras and Nares Abyssal Plains, Western North Atlantic Ocean, Determined from Velocities and Physical Properties of Sediment Cores.
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JAERI-M-8310 2281

ACTIVITY CYCLES (BIOLOGY)
Main Results of the Experiments Conducted During the Flight of the Kosmos-1129 Biosatellite and the Status of Preparation of Studies on the Next Biosatellite.
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Reprint: Sigma-Conjugation and Sigma-Aromaticity.
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Reprint: Interfacial Fracture Mechanical Aspects of Adhesive Bonded Joints - A Review.
AD-A093 859/7 2244

States of Stress and Strain in Adhesive Joints Including Photoelastic Imaging of Defects in Adherends.
AD-A093 939/7 2216

Adhesives: Properties, Preparation, and Applications. 1976-1978 (Citations from the NTIS Data Base).
PB81-802407 2216

Adhesives: Properties, Preparation, and Applications. 1979-December, 1980 (Citations from the NTIS Data Base).
PB81-802415 2216

ADJUSTMENT (PSYCHOLOGY)
Adjustment and Attitudes of Vietnam Returnees.
AD-A093 457/0 2144

ADOLESCENTS
Adolescent Pregnancy. Human Services Bibliography Series.
HRP-0902693/1 2157

ADSORPTION
Reprint: The Adsorption of Cycloparaffins on Ru(001) as Studied by Temperature Programmed Desorption and Electron Stimulated Desorption.
PB81-144776 2187

AECL
Annual Report, 1978-1979.
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AERIAL GUNNERY
System Operational Concept for the Aerial Gunnery Target System.
AD-A093 512/2 2140

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Analysis of Pressure Spectra Measurements in a Ducted Combustion System.
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Evaluation of the Acoustic and Aerodynamic Characteristics of Several Slot-Baffle Configurations for Transonic Wind Tunnel Walls.
AD-A093 957/9 2253

Experimental Aerodynamic Characteristics of Two V/STOL Fighter/Attack Aircraft Configurations at Mach Numbers from 0.4 to 1.4.
N81-14981/7 2119

AERODYNAMIC COEFFICIENTS
Determination of the Hypersonic-Continuum/Rarefied-Flow Drag Coefficient of the Viking Lander Capsule 1 Aeroshell from Flight Data.
N81-14961/9 2301

AERODYNAMIC CONFIGURATIONS
Wind-Tunnel Test of an Articulated Helicopter Rotor Model with Several Tip Shapes.
AD-A093 711/0 2117

A System for Aerodynamic Design and Analysis of Supersonic Aircraft. Part 1: General Description and Theoretical Development.
N81-14970/0 2118

A System for Aerodynamic Design and Analysis of Supersonic Aircraft. Part 3: Computer Program Description.
N81-14971/8 2119

Leading-Edge Deflection Optimization for a Highly Swept Arrow Wing Configuration.
N81-14974/2 2119

An Investigation of Support-Interference Effects.
N81-14984/1 2116

Drag
Drag loading on model targets.
AD-357 969/5 2285

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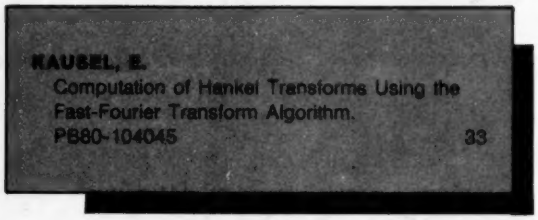

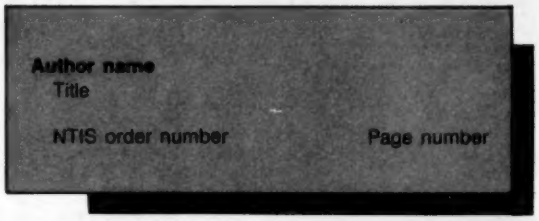

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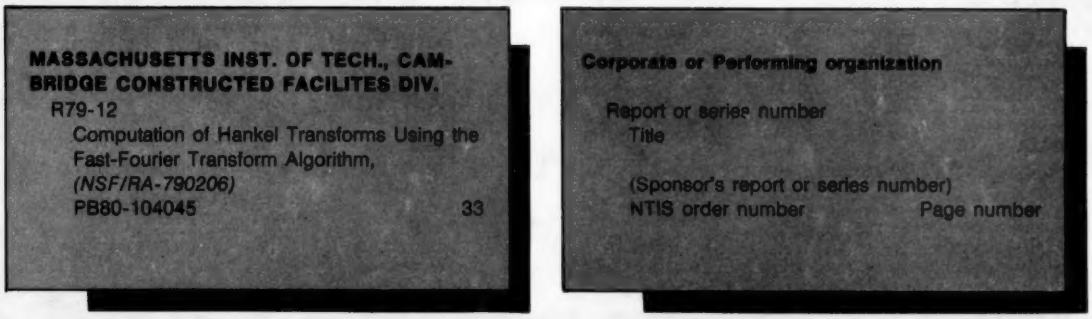

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Entries in this index list reports produced as a result of research done under specific contract or grant numbers. Entries are arranged first, alphanumerically, by the contract or grant number, and then by the corporate or performing organization.

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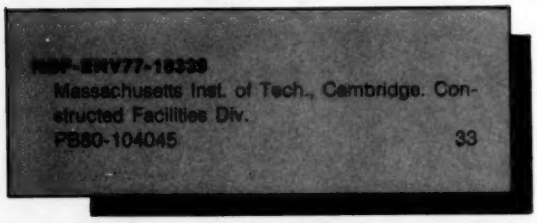

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AD-A093 515/5 2244

DAAK11-79-C-0073
Environmental Research Inst. of Michigan, Ann Arbor.
AD-A093 480/2 2255

DAAK40-78-C-0290
Hughes Aircraft Co., Fullerton, CA. Ground Systems Group.
AD-A093 797/9 2252

DAAK70-79-C-0150
Honeywell Systems and Research Center, Minneapolis, MN.
AD-A094 008/0 2264

DAAK70-79-V-0108
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
AD-A093 682/3 2265

DAAK80-79-C-0780
Research Triangle Inst., Research Triangle Park, NC. Systems and Measurements Div.
AD-A093 735/9 2204

DACW66-72-C-0269
Idaho Univ., Moscow.
AD-A093 708/6 2164

DAHC19-69-C-0018
Human Resources Research Organization, Alexandria, VA.
AD-A093 457/0 2144

DAHC19-73-C-0004
Human Resources Research Organization, Alexandria, VA.
AD-A093 659/1 2144
AD-A093 781/3 2142

DARPA ORDER-3119
University of Southern California, Los Angeles. Image Processing Inst.
AD-A094 006/4 2205

DARPA ORDER-3984
Rockwell International, Thousand Oaks, CA. Science Center.
AD-A093 843/1 2208

DCPA01-79-C-0304
Woodward-Clyde Associates, San Francisco, CA.
AD-A093 624/5 2256

DE-A101-77CS-51044
Eaton Corp., Southfield, MI. Engineering and Research Center.
N81-15366/0 2245
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N81-15367/8 2247

DE-AC02-76CH00016
Brookhaven National Lab., Upton, NY.
NUREG/CR-1738 2278
PB81-155053 2254

DE-AC03-76SF00326
Stanford Univ., CA. Systems Optimization Lab.
AD-A093 618/7 2231

DE-AC05-79ET-53044
Maryland Univ., College Park. Dept. of Physics and Astronomy.
AD-A093 639/3 2291
AD-A093 640/1 2229

DE-AC09-76SR00001
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
NUREG/CR-1645 2278

DE-AI01-77CS-51040
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N81-15241/5 2300

DE-AI01-77CS-51044
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N81-15464/3 2207
N81-15465/0 2245

DE-AI03-80ET-11272
Little (Arthur D.), Inc., Cambridge, MA.
N81-15461/9 2213
N81-15462/7 2214

DE-AM03-76-SF00010
Scripps Institution of Oceanography, La Jolla, CA.
AD-A093 949/6 2199

DEN3-121
Little (Arthur D.), Inc., Cambridge, MA.
N81-15461/9 2213
N81-15462/7 2214

DEN3-124
Eaton Corp., Southfield, MI. Engineering and Research Center.
N81-15366/0 2245

DHEW-100-79-0042
System Sciences, Inc., Bethesda, MD.
PB81-155632 2161

DI-CX5000-7-0699
Florida Univ., Gainesville. Center for Wetlands.
PB81-156507 2242
PB81-156515 2242

DI-14-34-0001-0132
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
PB81-148074 2193

DI-14-34-0001-0133
New Mexico Water Resources Research Inst., Las Cruces.
PB81-148058 2120

DI-14-34-0001-0134
Cornell Univ., Ithaca, NY. School of Civil and Environmental Engineering.
PB81-152035 2193

DI-14-34-0001-7203
Nebraska Water Resources Center, Lincoln.
PB81-147803 2237

DI-14-34-0001-8006
Colorado Water Resources Research Inst., Fort Collins.
PB81-156614 2147

DI-14-34-0001-8043
Clemson Univ., SC. Water Resources Research Inst.
PB81-150252 2165

DI-14-34-0001-8566
Rohm and Haas Co., Bristol, PA. Engineering Div.
PB81-147837 2182

DI-14-34-0001-9029
Nebraska Water Resources Center, Lincoln.
PB81-148066 2120

DI-14-34-0001-9043
Clemson Univ., SC. Water Resources Research Inst.
PB81-150252 2165

DI-14-34-0001-9050
Caribbean Research Inst., St. Thomas, VI. Water Resources Research Center.
PB81-147829 2238

DL-J-9-M-0-0070
National Opinion Research Center, New York.
PB81-154031 2135

DL-20-25-77-15
Abt Associates, Inc., Cambridge, MA.
PB81-151466 2145

DL-91-36-79-37
New York State School of Industrial and Labor Relations, Ithaca.
PB81-156416 2143

DL-91-42-77-33
Pennsylvania Univ., Philadelphia.
PB81-150427 2143

DL-91-42-78-31
Pennsylvania Univ., Philadelphia.
PB81-146821 2143

DL-91-95-79-11
Boston Coll., Chestnut Hill, MA. Social Welfare Research Inst.
PB81-148512 2134

DNA001-76-C-0390
Weidlinger Associates, New York.
AD-A093 728/4 2257

DNA001-78-C-0204
Colorado Div. of Highways, Denver.
AD-A093 517/1 2267

DNA001-78-C-0401
Rosenbaum (Harold) Associates, Inc., Burlington, MA.
AD-A093 980/1 2207

DNA001-79-C-0114
Systems, Science and Software, La Jolla, CA.
AD-A093 794/6 2200

DNA001-79-C-0157
Kaman AviDyne, Burlington, MA.
AD-A093 729/2 2117

DO-A01-78-00-384
International Maritime Associates, Inc., Washington, DC.
PB81-152951 2250

DO-A01-78-00-3084
International Maritime Associates, Inc., Washington, DC.
PB81-152944 2249
PB81-152969 2250
PB81-152977 2250
PB81-152985 2250
PB81-152993 2250

DOT-CG-74248-A
National Research Council, Washington, DC.
AD-A093 809/2 2168

DOT-FA76WAI-612
IIT Research Inst., Annapolis, MD.
AD-A093 448/9 2262
AD-A093 449/7 2262

DOT-FH-11-8502
KLD Associates, Inc., Huntington, NY.
PB81-145591 2237

DOT-FH-11-9125
California State Dept. of Transportation, Sacramento.
PB81-154940 2246

DOT-FH-11-9264
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
PB81-154361 2201

DOT-HS-8-02025
Kinetic Research, Goleta, CA.
PB81-153264 2240

DOT-OS-60154
CONSAD Research Corp., Pittsburgh, PA.

PB81-156390 2246

DOT-UT-70032
Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div.
PB81-151342 2245

EC-77-A-31-1034
Delaware Univ., Newark.
N81-15466/8 2215

EC-77-A-31-1040
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N81-15068/2 2222

EC-77-A-31-1041
Jet Propulsion Lab., Pasadena, CA.
JPL-PUBL-79-35(V.2) 2207

EC-77-A-31-1042
Army Mobility Equipment Research and Development Command, Fort Belvoir, VA.
AD-A093 737/5 2245
AD-A093 738/3 2245
AD-A093 746/6 2245

EDA-99-26-09886-10
Lehigh Univ., Bethlehem, PA.
PB81-153934 2130

EF-77-A-01-2593
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N81-15069/0 2297

EF-77-C-01-2468-007
Engineering Societies Commission on Energy, Inc., Washington, DC.
FE-2468-63 2213

EG-77-G-01-1670
La Quinta Motor Inns, Inc., San Antonio, TX.
N81-15460/1 2233

EMW-C-0017
Far West Lab. for Educational Research and Development, San Francisco, CA.
AD-A094 007/2 2142

EMW-C-0365
Coastal Area Planning and Development Commission, Brunswick, GA.
AD-A093 537/9 2126

EN-77-C-02-4057
United Engineers and Constructors, Inc., Philadelphia, PA.
COO-4057-13(V.3) 2277

EPA-C-06-1042-010
Los Angeles-Orange County Metropolitan Area Project, Whittier, CA.
PB81-152548 2240
PB81-152555 2240
PB81-153124 2240
PB81-153132 2240

EPA-R-803566
Northern Cheyenne Research Project, Lame Deer, MT.
PB81-155061 2193

EPA-R-804256
Akron Univ., OH.
PB81-152498 2179

EPA-R-804606-02
Loma Linda Univ., CA. School of Health.
PB81-152506 2179

EPA-R-804813
Syracuse Univ. Research Corp., NY.
PB81-153843 2180

EPA-R-805012
Thomas, Dean and Hoskins, Inc., Great Falls, MT.
PB81-152050 2240

EPA-R-805141
IIT Research Inst., Chicago, IL. Life Sciences Research Div.
PB81-150963 2179

EPA-R-805557
Massachusetts Univ., Amherst. Dept. of Public Health.
PB81-152381 2179

EPA-R-805612-02
Massachusetts Univ., Amherst.
PB81-148884 2179

EPA-S-804696010
Carr Research Lab., Inc., Wellesley, MA.
PB81-150898 2193

EPA-68-01-0745
Mississippi State Univ., Mississippi State.
PB81-151045 2165

EPA-68-01-4709
Purdue Research Foundation, Lafayette, IN. Div. of Sponsored Programs.
PB81-147035 2167

EPA-68-01-4999
Hoffman-Muntner Corp., Silver Spring, MD.
PB81-153926 2211

EPA-68-01-5878
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
PB81-146714 2134

EPA-68-02-1768
Pennsylvania State Univ., University Park. Center for Air Environment Studies.
PB81-150765 2179

EPA-68-02-2608
Radian Corp., Austin, TX.
PB81-152043 2240

EPA-68-02-3110
Westinghouse Research and Development Center, Pittsburgh, PA.
PB81-150617 2238

EPA-68-03-2506
ACT Systems, Inc., Winter Park, FL.
PB81-152183 2135

EPA-68-03-2766
Touhill, Shuckrow and Associates, Inc., Pittsburgh, PA.
PB81-150583 2238

ET-78-I-01-3218
Naval Coastal Systems Center, Panama City, FL.
AD-A093 940/5 2253

EX-76-C-01-2353
Exxon Research and Engineering Co., Florham Park, NJ. Synthetic Fuels Engineering Div.
FE-2353-13 2181

F04694-67-C-0007
Ac Electronics-Defense Research Labs Santa Barbara Calif Aerospace Operations Dept
AD-846 491/9 2285
AD-846 765/6 2287

F04694-67-C-0020
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
AD-846 492/7 2285

F04694-67-C-0033
General Motors Technical Center, Warren, MI. Materials and Structures Lab.
AD-847 162/5 2219

F04701-68-C-0041
TRW Systems Group, Redondo Beach, CA.
AD-848 843/9 2285

F04701-68-C-0200
Aerospace Corp., San Bernardino, CA. San Bernardino Operations.
AD-846 676/5 2232

F04701-79-C-0080
Aerospace Corp., El Segundo, CA. Aerophysics Lab.
AD-A093 741/7 2257

F04701-80-C-0081
Aerospace Corp., El Segundo, CA. Aerophysics Lab.
AD-A093 741/7 2257
Aerospace Corp., El Segundo, CA. Lab. Operations.
AD-A093 759/9 2184
AD-A093 764/9 2122
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
AD-A093 765/6 2124

F04704-80-C-0018
TRW Defense and Space Systems Group, San Bernardino, CA.
AD-A093 847/2 2204

F08635-77-C-0248
Harco Corp., Medina, OH.
AD-A094 017/1 2218

F08635-78-C-0307
California Univ., Riverside. Statewide Air Pollution Research Center.
AD-A093 486/9 2123

F08635-79-C-0084
Little (Arthur D.), Inc., Cambridge, MA.
AD-A093 817/5 2235

F19628-69-C-0258
Honeywell, Inc., Minneapolis, MN. Aerospace Div.
AD-514 827/5 2122

F19628-77-C-0005
Rice Univ., Houston, TX.
AD-A093 928/0 2124

F19628-78-C-0006
IIT Research Inst., Annapolis, MD.
AD-A093 448/9 2262
AD-A093 449/7 2262

F19628-78-C-0225
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
AD-A093 506/4 2292

F19628-78-C-0227
PhotoMetrics, Inc., Lexington, MA.
AD-A093 926/4 2125

F19628-79-C-0033
Systems and Applied Sciences Corp., Riverdale, MD.
AD-A094 020/5 2125

F19628-79-C-0068
Northwestern Univ., Evanston, IL. Dept. of Electrical Engineering and Computer Science.
AD-A094 018/9 2124

F19628-80-C-0001
MITRE Corp., Bedford, MA.
AD-A093 511/4 2259

F19628-80-C-0002
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
AD-A093 690/6 2265
AD-A093 691/4 2265

F19628-80-C-0054
Nevada Univ., Reno. Desert Research Inst.
AD-A093 927/2 2124

F29601-78-C-0082
Mission Research Corp., Albuquerque, NM.
AD-A093 772/2 2118

F30602-78-C-0072
Institute for Research, State College, PA.
AD-A093 498/4 2264

F30602-78-C-0142
CNR, Inc., Needham, MA.
AD-A093 491/9 2207

F30602-78-C-0186
Texas Instruments, Inc., Dallas. Semiconductor Group.
AD-A093 492/7 2201

F30602-78-C-0315
Westinghouse Defense and Electronic Systems Center, Baltimore, MD. Advanced Technology Labs.
AD-A093 496/8 2203

F30602-79-C-0034
Pattern Analysis and Recognition Corp., Rome, NY.
AD-A093 497/6 2203

F30602-79-C-0078
TRW Defense and Space Systems Group, Redondo Beach, CA.
AD-A093 680/7 2203

F30602-79-C-0116
Atlantic Research Corp., Rome, NY.
AD-A093 493/5 2265

F30602-79-C-0150
PRC Information Sciences Co., McLean, VA.
AD-A093 490/1 2203

F33615-72-C-2122
TRW Systems Group, Redondo Beach, CA.
AD-B000 374/9 2219

F33615-75-C-2053
Systems Control, Inc. (VT), Palo Alto, CA.
AD-A093 868/8 2298

F33615-76-C-3070
Honeywell Systems and Research Center, Minneapolis, MN.
AD-A093 888/6 2118

F33615-77-C-0068
Applied Digital Communications, Moorestown, NJ.
AD-A093 734/2 2140

F33615-77-C-0514
Bolt Beranek and Newman, Inc., Cambridge, MA.
AD-A093 948/8 2283

F33615-77-C-0615
Technology, Inc., San Antonio, TX. Life Sciences Div.
AD-A093 662/5 2175

F33615-77-C-5082
General Electric Co., Cincinnati, OH.
AD-A093 992/6 2221

F33615-77-C-5195
Research Triangle Inst., Research Triangle Park, NC.
AD-A093 820/9 2224

F33615-78-C-0032
Applied Psychological Services, Inc., Wayne, PA.
AD-A093 981/9 2144

F33615-78-C-0507
Dayton Univ., OH. Research Inst.
AD-A093 989/2 2119

F33615-78-C-5127
Dayton Univ., OH. Research Inst.
AD-A093 531/2 2203

F33615-79-C-0500
Systems Research Labs., Inc., Dayton, OH.
AD-A094 023/9 2265

F33615-79-C-0503
Systems Research Labs., Inc., Dayton, OH.
AD-A093 952/0 2140
AD-A094 021/3 2142

F33615-80-C-1080
University of Southern California, Los Angeles. Image Processing Inst.

AD-A094 006/4 2205

F33657-76-C-0021
General Motors Corp., Indianapolis, IN. Detroit Diesel Allison Div.
AD-A093 958/7 2298

F40600-80-C-0001
Arnold Engineering Development Center, Arnold AFS, TN.
AD-861 437/2 2118

F40600-72-C-0003
Arnold Engineering Development Center, Arnold AFS, TN.
AD-889 022/0 2251

F44620-76-C-0036
Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
AD-A093 881/1 2185

F44620-76-C-0041
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
AD-A093 901/7 2293
AD-A093 902/5 2293
AD-A093 903/3 2293
AD-A093 904/1 2293
AD-A093 905/8 2185
AD-A093 906/6 2293
AD-A093 907/4 2293

F49620-77-C-0023
RAND Corp., Santa Monica, CA.
AD-A093 644/3 2256
AD-A093 744/1 2302

F49620-77-C-0099
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
AD-A093 788/8 2204

F49620-78-C-0030
California Univ., Santa Barbara. Inst. for Algebra and Combinatorics.
AD-A093 895/1 2230
AD-A093 914/0 2230

F49620-78-C-0060
University of Southern California, Los Angeles. School of Engineering.
AD-A093 528/8 2284

F49620-78-C-0082
GTE Labs., Inc., Waltham, MA.
AD-A093 652/6 2292

F49620-78-C-0100
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
AD-A093 812/6 2218

F49620-78-C-0110
SRI International, Menlo Park, CA.
AD-A093 879/5 2225

F49620-79-C-0004
Connecticut Univ., Storrs. Dept. of Metallurgy.
AD-A093 802/7 2220

F49620-79-C-0058
Stanford Univ., CA. Dept. of Electrical Engineering.
AD-A093 899/3 2260

F49620-79-C-0123
Georgia Inst. of Tech., Atlanta. School of Mathematics.
AD-A093 876/1 2230

F49620-79-C-0140
South Carolina Univ., Columbia. Dept. of Mathematics and Statistics.
AD-A093 445/5 2226

F49620-79-C-0142
State Univ. of New York at Buffalo. Dept. of Chemistry.
AD-A093 871/2 2185

F49620-79-C-0161
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
AD-A093 816/7 2229
AD-A093 824/1 2230
AD-A093 844/9 2230
AD-A093 875/3 2230

F49620-80-C-0009
Weidlinger Associates, Menlo Park, CA.
AD-A093 791/2 2199

F49620-80-C-0021
Rondout Associates, Inc., Stone Ridge, NY.
AD-A093 849/8 2200

F49620-80-C-0059
Applied Research Associates, Inc., Albuquerque, NM.
AD-A093 882/9 2267

FDA-223-79-5065
PRC Information Sciences Co., McLean, VA.
PB81-152803 2173
PB81-152811 2173
PB81-152829 2173
PB81-152837 2173
PB81-152845 2173
PB81-152852 2173

FG01-77ET12463
Colorado School of Mines, Golden. Excavation Engineering and Earth Mechanics Inst.
DOE/ET/12463-1 2194

FG01-78CS56604
Texas A and M Univ., College Station. Dept. of Mechanical Engineering.
DOE/CS/56604-T1 2212

FG01-79CS60467
Massachusetts Building Code Commission, Boston.
DOE/CS/60467-01 2233

FG01-79IR10238
Arizona Univ., Tucson. Dept. of Elementary Education.
DOE/IR/10238-T1 2210

FG01-79RG10027
American Public Power Association, Washington, DC.
DOE/RG/10027-01 2210

FG02-79CS30169
Davis Alternative Technology Associates, CA.
DOE/CS/30169-4 2210

FG04-77CS34153
Living Systems, Winters, CA.
DOE/CS/34153-3 2233

FG05-79IR10144
Dayton Univ., OH
DOE/IR/10144-T1 2142

FG21-78ET12229
Illinois Inst. of Tech., Chicago.
DOE/ET/12229-T1 2181

HUD-H-1682
Massachusetts Inst. of Tech., Cambridge.
PB81-169450 2148

HUD-H-1789
RAND Corp., Santa Monica, CA.
PB81-151847 2146
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Abt Associates, Inc., Cambridge, MA.
PB81-151730 2145
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PB81-151771 2145
PB81-151797 2146
PB81-151805 2146
PB81-151813 2146
PB81-151979 2147

HUD-H-2162R
Urban Inst., Washington, DC.
PB81-169278 2130
PB81-169286 2147
PB81-169302 2135
PB81-169310 2147
PB81-169328 2147
PB81-169336 2148
PB81-169344 2148
PB81-169351 2148
PB81-169369 2148

HUD-H-2261R
Johns-Manville Sales Corp., Denver, CO. Research and Development Center.
PB81-169484 2234
PB81-169492 2252

HUD-H-2269
John F. Kennedy School of Government, Cambridge, MA. Inst. of Politics.
PB81-169658 2143

HUD-H-2279
Stanford Univ., CA. Stanford Mid-Peninsula Urban Coalition.
PB81-169526 2149

HUD-H-2338R
Copley International Corp., La Jolla, CA.
PB81-169393 2135
PB81-169401 2136
PB81-169419 2136
PB81-169427 2136

HUD-H-2496
American Planning Association, Chicago, IL.
PB81-151896 2146

HUD-H-2519
Leadership Council for Metropolitan Open Communites, Chicago, IL.
PB81-169518 2149

HUD-H-2567
Johns-Manville Sales Corp., Denver, CO. Research and Development Center.
PB81-169468 2252
Urban Inst., Washington, DC.
PB81-169476 2252

HUD-H-2644
HUD USER, Germantown, MD.
PB81-151862 2132

HUD-H-2649
Southwest Research Inst., San Antonio, TX.
PB81-151870 2251

HUD-H-2658
Houston Office of the Mayor, TX. Planning Coordination Div.
PB81-169575 2150
PB81-169583 2150
PB81-169591 2150
PB81-169609 2150

HUD-H-2664
HUD USER, Germantown, MD.
PB81-169724 2151
PB81-169732 2151
PB81-169740 2151

HUD-H-2878
Abt Associates, Inc., Cambridge, MA.
PB81-151854 2146

HUD-H-2882
Urban Inst., Washington, DC.
PB81-151888 2146

HUD-H-2915RG
John F. Kennedy School of Government, Cambridge, MA.
PB81-151839 2134

HUD-H-5040
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
PB81-169831 2152

HUD-H-5088RG
National Opinion Research Center, Chicago, IL.
PB81-169781 2131

HUD-H-5108G
Woodrow Wilson International Center for Scholars, Washington, DC.
PB81-169849 2252

HUD-H-5233
Northeast Ohio Areawide Coordinating Agency, Cleveland.
PB81-151920 2147

IA-16666
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
AD-A093 830/8 2138
AD-A093 831/6 2138
AD-A093 832/4 2138
AD-A093 833/2 2138
AD-A093 834/0 2138

IAO-NEPO-79-1032
Construction Engineering Research Lab. (Army), Champaign, IL.
AD-A093 959/5 2128

IAO-PR-9-80
Construction Engineering Research Lab. (Army), Champaign, IL.
AD-A093 761/5 2119

J0188170
Little (Arthur D.), Inc., Cambridge, MA.
PB81-148397 2223

M00014-76-C-0134
California Univ., Berkeley. Operations Research Center.

AD-A093 786/2 2232

MA-79-SACB-0004
Hydronautics, Inc., Laurel, MD.
PB81-151599 2249

MA80-SAC-01016
Logical Technical Services Corp., Vienna, VA.
PB81-155244 2250

MDA903-74-C-0289
University of Southern California, Los Angeles. International Relations Research Inst.
AD-A093 884/5 2138

MDA903-78-C-0188
RAND Corp., Santa Monica, CA.
AD-A093 644/3 2256

MDA903-78-C-0356
Bolt Beranek and Newman, Inc., Cambridge, MA.
AD-A093 513/0 2259

MDA903-79-C-0667
Burt Associates, Inc., Bethesda, MD.
AD-A093 779/7 2144
AD-A093 880/3 2144

MDA903-80-C-0093
Wharton School, Philadelphia, PA. Dept. of Decision Sciences.
AD-A093 594/0 2140

MDA903-80-C-0498
Rockwell International, Thousand Oaks, CA. Science Center.
AD-A093 843/1 2208

MDA940-79-C-0411
Bolt Beranek and Newman, Inc., Cambridge, MA.
AD-A093 850/6 2259

MIPR-79-0042
United States International Univ., San Diego, CA.
AD-A093 811/8 2144

N01-AM-7-2211
Utah Univ., Salt Lake City. Inst. for Biomedical Engineering.
PB81-150062 2160

N01-HR-7-2972
National Asthma Center, Denver, CO.
PB81-150849 2160

N00014-67-A-0112-0072
Stanford Univ., CA. Thermosciences Div.
AD-A094 011/4 2285

N00014-73-C-0094
Institute of Environmental Medicine and Physiology, Seattle, WA.
AD-A093 485/1 2155

N00014-74-C-0063
Northwestern Univ., Evanston, IL. Dept. of Civil Engineering.
AD-A093 530/4 2244

N00014-74-C-0262
Woods Hole Oceanographic Institution, MA.
AD-A093 723/5 2189

N00014-75-C-0152
Scripps Institution of Oceanography, La Jolla, CA.
AD-A093 559/3 2190
AD-A093 949/6 2199

N00014-75-C-0192
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
AD-A093 841/5 2199

N00014-75-C-0201
Florida State Univ., Tallahassee. Dept. of Oceanography.
AD-A093 475/2 2190

N00014-75-C-0210
Lamont-Doherty Geological Observatory, Palisades, NY.
AD-A093 467/9 2192
AD-A093 468/7 2192
AD-A093 469/5 2196
AD-A093 471/1 2198
AD-A093 664/1 2199
AD-A093 665/8 2283
AD-A093 666/6 2199
AD-A093 667/4 2199

N00014-75-C-0267
Stanford Univ., CA. Systems Optimization Lab.
AD-A093 617/9 2231
AD-A093 618/7 2231

N00014-75-C-0291
Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
AD-A093 473/7 2283

N00014-75-C-0375
Cornell Univ., Ithaca, NY. Dept. of Aerospace Engineering.
AD-A093 458/8 2115

N00014-75-C-0397
New York Univ., NY. Dept. of Chemistry.
AD-A093 726/8 2184

N00014-75-C-0482
Wharton School, Philadelphia, PA. Dept. of Decision Sciences.
AD-A093 594/0 2140
AD-A093 878/7 2204

N00014-75-C-0492
Virginia Polytechnic Inst. and State Univ., Blacksburg.
AD-A093 855/5 2232

N00014-75-C-0502
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
AD-A093 550/2 2199

N00014-75-C-0518
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
AD-A093 917/3 2208

N00014-75-C-0621
Carnegie-Mellon Univ., Pittsburgh, PA. Management Sciences Research Group.
AD-A093 963/7 2232

N00014-75-C-0643
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A093 886/0 2204
AD-A093 925/6 2255
AD-A093 932/2 2204
AD-A093 933/0 2204

N00014-75-C-0716
Purdue Univ., Lafayette, IN. Great Lakes Coastal Research Lab.
AD-A093 452/1 2190

N00014-75-C-0880
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
AD-A093 972/8 2186
AD-A093 976/9 2186

N00014-75-C-0922
Texas Univ. at Austin. Dept. of Chemistry.
AD-A093 650/0 2183

N00014-76-C-0016
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
AD-A094 010/6 2124

N00014-76-C-0067
Oregon State Univ., Corvallis. School of Oceanography.
AD-A093 674/0 2199

N00014-76-C-0134
California Univ., Berkeley. Operations Research Center.
AD-A093 785/4 2134

N00014-76-C-0207
Stanford Univ., CA. Inst. for Plasma Research.
AD-A093 593/2 2122

N00014-76-C-0226
Rhode Island Univ., Kingston. Graduate School of Oceanography.
AD-A093 942/1 2189

N00014-76-C-0342
Delaware Univ., Newark. Dept. of Civil Engineering.
AD-A093 687/2 2190

N00014-76-C-0378
Northestern Univ., Evanston, IL. Dept. of Mechanical and Nuclear Engineering.
AD-A093 950/4 2186

N00014-76-C-0409
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Metallurgy and Materials Science.
AD-A093 964/5 2221
AD-A093 965/2 2221
AD-A093 966/0 2221

N00014-76-C-0532
Stanford Univ., CA. Thermosciences Div.
AD-A094 011/4 2285

N00014-76-C-0816
North Carolina Univ. at Chapel Hill. Dept. of Chemistry.
AD-A093 586/6 2182
AD-A093 587/4 2183

N00014-76-C-0932
Carnegie-Mellon Univ., Pittsburgh, PA.
AD-A093 514/8 2126

N00014-76-C-1009
Virginia Univ., Charlottesville. Dept. of Materials Science.
AD-A093 451/3 2284

N00014-77-C-0002
Harvard Univ., Cambridge, MA. Gordon McKay Lab.
AD-A093 472/9 2292

N00014-77-C-0050
Case Western Reserve Univ., Cleveland, OH. Dept. of Medicine.
AD-A093 846/4 2156

N00014-77-C-0122
Stevens Inst. of Tech., Hoboken, NJ. Davidson Lab.
AD-A093 474/5 2248

N00014-77-C-0144
Hawaii Univ. Medical School, Honolulu. Dept. of Physiology.
AD-A093 668/2 2177

N00014-77-C-0209
Minnesota Univ., Minneapolis. Dept. of Chemistry.
AD-A093 804/3 2184

N00014-77-C-0373
Phrasor Scientific, Inc., Duarte, CA.
AD-A093 645/0 2246

N00014-77C-0389
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A093 934/8 2205

N00014-77-C-0406
Duke Univ. Medical Center, Durham, NC. F.G. Hall Lab. for Environmental Research.
AD-A093 663/3 2155

N00014-77-C-0488
Battelle Columbus Labs., OH.
AD-A093 453/9 2219

N00014-77-C-0524
Grumman Aircraft Engineering Corp., Bethpage, NY. Research Dept.
AD-A093 671/6 2284

N00014-77-C-0553
New York Univ., NY. Dept. of Physics.
AD-A093 578/3 2183
AD-A093 579/1 2291
AD-A093 580/9 2291

N00014-77-C-0569
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
AD-A093 945/4 2220

N00014-77-C-0743
Virginia Polytechnic Inst. and State Univ., Blacksburg.
AD-A093 855/5 2232
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
AD-A093 679/9 2231
AD-A093 707/8 2231

N00014-77-G-0063
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 983/5 2230

N00014-78-C-0124
Colorado State Univ., Fort Collins.
AD-A093 715/1 2292
AD-A093 716/9 2292
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
AD-A093 717/7 2293
AD-A093 724/3 2293
AD-A093 943/9 2293

N00014-78-C-0218
Cambridge Acoustical Associates, Inc., MA.
AD-A093 455/4 2283

N00014-78-C-0297
Stanford Univ., CA. Stanford Electronics Labs.
AD-A093 623/7 2292

N00014-78-C-0312
Georgia Inst. of Tech., Atlanta. School of Industrial and Systems Engineering.
AD-A093 558/5 2226

N00014-78-C-0498
Hawaii Univ., Honolulu. Dept. of Electrical Engineering.
AD-A093 533/8 2131

N00014-78-C-0592
Texas Univ. at Austin. Dept. of Chemistry.
AD-A093 845/6 2185

N00014-78-C-0633
Wisconsin Univ.-Madison. Dept. of Chemistry.
AD-A093 692/2 2183
AD-A093 695/5 2183

N00014-78-C-0670
Tracor Applied Sciences, Austin, TX.
AD-A093 867/0 2258

N00014-79-C-0004
Oregon State Univ., Corvallis. School of Oceanography.
AD-A093 674/0 2199

N00014-79-C-0168
Center for Blood Research, Boston, MA.

AD-A093 447/1 2155

N00014-79-C-0321
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 636/9 2229
AD-A093 637/7 2229

N00014-79-C-0458
Dynamics Technology, Inc., Torrance, CA.
AD-A093 982/7 2116

N00014-79-C-0519
United States International Univ., San Diego, CA.
AD-A093 811/8 2144

N00014-79-C-0553
Texas Univ. at Austin. Dept. of Electrical Engineering.
AD-A093 941/3 2201

N00014-79-C-0583
Rensselaer Polytechnic Inst., Troy, NY.
AD-A093 454/7 2220

N00014-79-C-0668
Oregon State Univ., Corvallis. Dept. of Physics.
AD-A093 693/0 2183
AD-A093 694/8 2183

N00014-79-C-0680
Maryland Univ., College Park. Coll. of Business and Management.
AD-A093 686/4 2141

N00014-79-C-0694
Massachusetts Inst. of Tech., Cambridge.
AD-A093 944/7 2185

N00014-79-C-0713
Scientific Research Associates, Inc., Glastonbury, CT.
AD-A093 736/7 2284

N00014-79-C-0766
Texas A and M Research Foundation, College Station.
AD-A093 978/5 2186

N00014-79-C-0788
Ionomet Co., Inc., Brighton, MA.
AD-A093 450/5 2255

N00014-79-G-0024
Microcirculatory Society.
AD-A093 653/4 2155

N00014-80-C-0026
Systems Control, Inc. (VT), Palo Alto, CA.
AD-A093 793/8 2125

N00014-80-C-0098
Lamont-Doherty Geological Observatory, Palisades, NY.
AD-A093 665/8 2283

N00014-80-C-0116
Northwestern Univ., Evanston, IL. Dept. of Materials Science.
AD-A093 725/0 2220

N00014-80-C-0172
Florida Univ., Gainesville. Dept. of Entomology and Nematology.
AD-A093 947/0 2156

N00014-80-C-0239
Center for Blood Research, Boston, MA.
AD-A093 447/1 2155

N00014-80-C-0262
Atmospheric and Environmental Research, Inc., Cambridge, MA.
AD-A093 466/1 2123

N00014-80-C-0325
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Statistics.
AD-A093 510/6 2226

N00014-80-C-0416
Louisiana State Univ. Medical Center, New Orleans.
AD-A093 529/6 2153

N00014-80-C-0622
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A093 933/0 2204

N00014-80-C-0654
Lamont-Doherty Geological Observatory, Palisades, NY.
AD-A093 470/3 2199

N00014-C-75-C-0819
State Univ. of New York at Albany. Inst. for the Study of Defects in Solids.
AD-A093 555/1 2284

N00019-79-C-0637
General Dynamics, San Diego, CA. Electronics Div.
AD-A093 651/8 2263

N00024-78-C-5384
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
PB81-151607 2161
Johns Hopkins Univ., Silver Spring, MD. Applied Physics Lab.
AD-A093 487/7 2262

N00024-79-C-6043
Pennsylvania State Univ., State College. Applied Research Lab.
AD-A093 500/7 2208

N00123-79-C-1335
Anacapa Sciences, Inc., Santa Barbara, CA.
AD-A093 539/5 2139

N00140-78-C-1491
Exxon Research and Engineering Co., Linden, NJ. Products Research Div.
AD-A093 842/3 2295

N00173-79-C-0109
BDM Corp., Albuquerque, NM.
AD-A093 540/3 2286

N00600-76-D-0511
Artech Corp., Falls Church, VA.
AD-A093 495/0 2217

N61339-78-C-0004
Veda, Inc., Arlington, VA.
AD-A093 767/2 2141

N62269-78-C-0410
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
AD-A093 516/3 2298

N62269-79-C-0275
McDonnell Aircraft Co., St. Louis, MO.
AD-A093 803/5 2220

N66001-79-C-0022
General Dynamics/Pomona, CA. Pomona Div.
AD-A093 446/3 2246

NA-79AA-D-0048
North Carolina State Univ. at Raleigh. Dept. of Botany.
PB81-158321 2190

NA79AA-D-00054
Washington Univ., Seattle. Div. of Marine Resources.
PB81-148876 2189

NAG1-70
Duke Univ., Durham, NC. Dept. of Computer Sciences.
N81-15702/6 2119

NAGW-13
University of Southern California, Los Angeles.
N81-15929/5 2123

NAS1-14174
Rockwell International, Anaheim, CA. Autonetics Strategic Systems Div.
AD-A093 642/7 2203

NAS1-14814
TRW Defense and Space Systems Group, Redondo Beach, CA.
N81-15180/5 2261

NAS1-15240
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
N81-15365/2 2301

NAS1-15534
Boeing Commercial Airplane Co., Seattle, WA.
N81-14970/0 2118
N81-14971/8 2119

NAS1-15546
Lockheed-Georgia Co., Marietta.
N81-14993/2 2119
N81-14994/0 2264

NAS3-20055
Detroit Diesel Allison, Indianapolis, IN.
N81-14976/7 2116

NAS3-20072
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
N81-15006/2 2299

NAS3-20599
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
N81-15005/4 2299

NAS3-20646
Pratt and Whitney Aircraft Group, East Hartford, CT.
N81-15002/1 2299

NAS3-21259
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
N81-15004/7 2299

NAS3-21288
Spectron Development Labs., Inc., Costa Mesa, CA.
N81-15003/9 2300

NAS3-21391
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
N81-15769/5 2300

NAS5-24287
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
N81-15155/7 2301

NAS5-24300
Computer Sciences Corp., Silver Spring, MD.
N81-15010/4 2302

NAS5-25061
Systems and Applied Sciences Corp., Riverdale, MD.
N81-15616/8 2124

NAS5-25069
Systems and Applied Sciences Corp., Riverdale, MD.
N81-15727/3 2126

NAS5-25098
Aerospace Corp., Los Angeles, CA. Electronics Research Lab.
N81-15349/6 2286

NAS5-25453
California Univ., Berkeley.
N81-12175/8 2219

NAS5-26128
Analytic Sciences Corp., Reading, MA.
N81-14990/8 2264

NAS-7-100-955217
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
DOE/JPL/955217-80/5 2212

NAS8-31233
Louisville Univ., KY.
N81-15017/9 2300

NAS8-32902
Institute for Advanced Study, Princeton, NJ.
N81-15913/9 2121

NAS8-33194
Martin Marietta Aerospace, Denver, CO. Denver Div.
N81-15193/8 2201

NAS8-33568
Rocketdyne, Canoga Park, CA.
N81-15019/5 2300

NAS8-33574
Aerojet Liquid Rocket Co., Sacramento, CA.
N81-15018/7 2300
N81-15020/3 2300

NAS8-33605
Georgia Inst. of Tech., Atlanta. Electromagnetics Lab.
N81-15459/3 2209

NAS8-33687
Harris Corp., Melbourne, FL. Government Information Systems Div.
N81-15707/5 2205
N81-15708/3 2205

NAS8-33725
Remtech, Inc., Huntsville, AL.
N81-15015/3 2301

NAS9-14658
Life Systems, Inc., Cleveland, OH.
N81-15701/8 2173

NAS9-15200
Lockheed Electronics Co., Inc., Houston, TX. Systems and Services Div.
N81-15642/4 2126

NAS9-15724
Aerojet Liquid Rocket Co., Sacramento, CA.
N81-15120/1 2301

NAS9-15778
Foster-Miller Associates, Inc., Waltham, MA.
N81-15700/0 2173

NAS9-16065
Life Systems, Inc., Cleveland, OH.
N81-15701/8 2173

NAS10-8986
University of Central Florida, Orlando. Dept. of Biological Sciences.
N81-15578/0 2165

NASA ORDER C-30969-D
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
N81-15463/5 2214

NASW-3198
National Aeronautics and Space Administration, Washington, DC.
N81-15579/8 2237
N81-15678/8 2178
N81-15682/0 2153
N81-15683/8 2153
N81-15684/6 2153
N81-15685/3 2178
N81-15686/1 2175
N81-15873/5 2247

NASW-3199
National Aeronautics and Space Administration, Washington, DC.
N81-14962/7 2118
N81-15011/2 2301

N81-15012/0 2301
N81-15425/2 2192
N81-15658/0 2158
N81-15659/8 2175
N81-15660/6 2175
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N81-15674/7 2168
N81-15675/4 2153
N81-15676/2 2159
N81-15677/0 2159
N81-15679/6 2159
N81-15680/4 2178
N81-15681/2 2175
N81-15687/9 2175

NB80-SBCA-0351
Booz-Allen and Hamilton, Inc., Bethesda, MD.
PB81-152100 2129

NBS-5-35870
Nottingham (H.D.) and Associates, Inc., McLean, VA.
PB81-169633 2234
PB81-169641 2234

NCC2-25
San Francisco State Univ., CA. Dept. of Biological Sciences.
N81-15663/0 2177

NE-5061-013
Aeronautical Research Inst. of Sweden, Stockholm.
N81-14985/8 2213

NGL-48-004-002
Washington Univ., Seattle. Coll. of Engineering.
N81-15105/2 2217

NGR-05-020-559
Stanford Univ., CA. Inst. for Plasma Research.
AD-A093 593/2 2122

NGR-39-009-017
Ohio Univ., Athens. Avionics Engineering Center.
N81-14989/0 2213

NOAA-04-6-158-44054
North Carolina State Univ. at Raleigh. Dept. of Food Science.
PB81-159360 2168

NOAA-04-8-M01-66
North Carolina State Univ. at Raleigh. Dept. of Food Science.
PB81-159360 2168

NOAA-04-8-M01-76
Florida Univ., Gainesville. Dept. of Food Science and Human Nutrition.
PB81-154221 2167

NSF-AER77-17031
Washington Univ., St. Louis, MO. Center for the Biology of Natural Systems.
PB81-146870 2119

NSF-ATM78-08865
Illinois State Water Survey, Urbana.
AD-A093 795/3 2125
AD-A093 796/1 2125

NSF-CHE76-80382
Kansas State Univ., Manhattan. Dept. of Chemistry.
AD-A093 526/2 2183

NSF-DAR76-80993
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
PB81-150294 2134

NSF-DAR78-17826
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
PB81-146862 2206

NSF-DAR78-27337
Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
PB81-148934 2248

NSF-DAR79-16706
Glass and Ceramics International, Inc., Lomita, CA.
PB81-146797 2237

NSF-DAR79-16720
Browning Engineering Corp., Hanover, NH.
PB81-151292 2218

NSF-DAR79-17035
Utah Geophysical, Inc., Salt Lake City.
PB81-146813 2196

NSF-DAR79-17099
Liquid Chemical Co., Inc., Hanford, CA.
PB81-146888 2196

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Crystal Systems, Inc., Salem, MA.
PB81-150302 2284

NSF-DAR79-17409
EIC, Inc., Newton, MA.
PB81-148926 2188

NSF-DAR79-17704
Spire Corp., Bedford, MA.
PB81-148942 2293

NSF-DAR79-17715
Spire Corp., Bedford, MA.
PB81-148579 2202

NSF-DI-39498
Auburn Univ., AL. Dept. of Mechanical Engineering.
PB81-150112 2234

NSF-DMR75-18104
State Univ. of New York at Albany. Inst. for the Study of Defects in Solids.
AD-A093 555/1 2284

NSF-DMR76-01111
Harvard Univ., Cambridge, MA. Gordon McKay Lab.
AD-A093 472/9 2292

NSF-DMR76-11418
National Bureau of Standards, Washington, DC.
PB81-144685 2187

NSF-DMR76-80847
Northwestern Univ., Evanston, IL. Dept. of Materials Science.
AD-A093 725/0 2220

NSF-DMR77-21888
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
AD-A093 903/3 2293

NSF-DPP75-05383
Washington Univ., Seattle. Quaternary Research Center.
AD-A093 523/9 2200

NSF-DSI77-18052
American Inst. of Physics, New York.
PB81-153314 2133

NSF-EAR78-14481
Lamont-Doherty Geological Observatory, Palisades, NY.
AD-A093 470/3 2199

NSF-ECS79-02506
Carnegie-Mellon Univ., Pittsburgh, PA. Management Sciences Research Group.
AD-A093 963/7 2232

NSF-ENG76-17145
Cincinnati Univ., OH.
PB81-147621 2261

NSF-ENG76-24368
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 630/2 2228

NSF-ENG77-22757
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
AD-A093 679/9 2231
AD-A093 707/8 2231

NSF-ISP77-13029
Battelle Southern Operations, Atlanta, GA.
PB81-134736 2128
PB81-134744 2128
PB81-134751 2128

NSF-ISP77-15089
Public Technology, Inc., Washington, DC.
PB81-135170 2128

NSF-ISP77-25883
Maryland State Dept. of Legislative Reference, Annapolis. Scientific Div.
PB81-148504 2129

NSF-ISP77-26003
Public Technology, Inc., Washington, DC.
PB81-158487 2133

NSF-ISP78-05130
Kentucky Univ., Lexington.
PB81-146847 2129

NSF-ISP78-13309
Puerto Rico Legislative Assembly, San Juan.
PB81-149064 2129

NSF-ISP78-14171
Maryland Dept. of State Planning, Baltimore. Comprehensive Policy Planning Div.
PB81-146854 2129

NSF-ISP79-10088
Washington Univ., Seattle.
PB81-150773 2143

NSF-ISR71-03842
Auburn Univ., AL. Dept. of Mechanical Engineering.
PB81-150112 2234

NSF-MCS77-01408
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 568/4 2227

NSF-MCS77-05623
Stanford Univ., CA.
AD-A093 520/5 2226

NSF-MCS77-07569
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A093 932/2 2204

NSF-MCS77-16054
California Univ., Berkeley. Operations Research Center.
AD-A093 785/4 2134

NSF-MCS78-02111
Maryland Univ., College Park.
AD-A093 861/3 2230

NSF-MCS78-04443
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 629/4 2228

NSF-MCS78-09525
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 570/0 2227
AD-A093 607/0 2227

NSF-MCS78-11985
Stanford Univ., CA. Dept. of Computer Science.
AD-A093 909/0 2192

NSF-MCS79-01998
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 564/3 2226

NSF-MCS79-04443
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A093 571/8 2231

NSF-MCS80-02152
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
AD-A093 816/7 2229

NSF-OCE76-18049
Lamont-Doherty Geological Observatory, Palisades, NY.
AD-A093 467/9 2192
AD-A093 468/7 2192

NSF-OCE78-25448
Lamont-Doherty Geological Observatory, Palisades, NY.
AD-A093 667/4 2199

NSF-PFR77-23519
Pittsburgh Univ., PA. Dept. of Civil Engineering.
PB81-148108 2251

NSF-PFR77-24063
Texas Tech Univ., Lubbock. Inst. for Disaster Research.
PB81-148421 2217

NSF-PFR78-11802
Applied Technology Council, Palo Alto, CA.
PB81-150591 2238

NSF-PFR78-19199
Boyle Engineering Corp., Orlando, FL.
PB81-148033 2165

NSF-PFR79-02871
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Civil Engineering.
PB81-150310 2200

NSF-PFR79-08960
California Univ., Los Angeles. Dept. of Mechanics and Structures.
PB81-154726 2251

NSF-PFR79-17110
Environmetrics, Inc., St. Louis, MO.
PB81-149122 2179

NSF-PFR79-17476
Ionomet Co., Inc., Brighton, MA.
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A03	6.50	E03	8.50	T03	210.00
A04	8.00	E04	10.50	T04	300.00
A05	9.50	E05	12.50	T05	360.00
A06	11.00	E06	14.50	T06	420.00
A07	12.50	E07	16.50	T07	480.00
A08	14.00	E08	18.50	T08	540.00
A09	15.50	E09	20.50	T09	600.00
A10	17.00	E10	22.50	T10	660.00
A11	18.50	E11	24.50	T11	720.00
A12	20.00	E12	27.50	T12	780.00
A13	21.50	E13	30.50	T13	840.00
A14	23.00	E14	33.50	T14	900.00
A15	24.50	E15	36.50	T15	960.00
A16	26.00	E16	39.50	T16	1,020.00
A17	27.50	E17	42.50	T17	1,080.00
A18	29.00	E18	45.50	T18	1,140.00
A19	30.50	E19	50.50	T19	1,200.00
A20	32.00	E20	60.50	T99	*
A21	33.50	E99	*		
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